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THESIS

NAVAL RESERVE SUPPORT TO INFORMATION OPERATIONS WARFIGHTING

by

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June 2001

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Since the mid-1990s, the Fleet Information Warfare Center (FIWC) has led the Navy's Information Operations (IO) support to the Fleet. Within the FIWC manning structure, there are in total 36 officer and 84 enlisted Naval Reserve billets that are manned to approximately 75 percent and located in Norfolk and San Diego Naval Reserve Centers. These Naval Reserve Force personnel could provide support to FIWC far and above what they are now contributing specifically in the areas of Computer Network Operations, Psychological Operations, Military Deception and Civil Affairs. Historically personnel conducting IO were primarily reservists and civilians in uniform with regular military officers being by far the minority. The Naval Reserve Force has the personnel to provide skilled IO operators but the lack of an effective manning document and training plans is hindering their opportunity to enhance FIWC's capabilities in full spectrum IO. This research investigates the skill requirements of personnel in IO to verify that the Naval Reserve Force has the talent base for IO support and the feasibility of their expanded use in IO.

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NAVAL RESERVE SUPPORT TO INFORMATION OPERATIONS WARFIGHTING

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ABSTRACT

Since the mid-1990s, the Fleet Information Warfare Center (FIWC) has led the Navy's Information Operations (IO) support to the Fleet. Within the FIWC manning structure, there are in total 36 officer and 84 enlisted Naval Reserve billets that are manned to approximately 75 percent and located in Norfolk and San Diego Naval Reserve Centers. These Naval Reserve Force personnel could provide support to FIWC far and above what they are now contributing specifically in the areas of Computer Network Operations, Psychological Operations, Military Deception and Civil Affairs. Historically personnel conducting IO were primarily reservists and civilians in uniform with regular military officers being by far the minority. The Naval Reserve Force has the personnel to provide skilled IO operators but the lack of an effective manning document and training plans is hindering their opportunity to enhance FIWC's capabilities in full spectrum IO. This research investigates the skill requirements of personnel in IO to verify that the Naval Reserve Force has the talent base for IO support and the feasibility of their expanded use in IO.

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ACRONYMS

CA	Civil Affairs
CINC	Commander In Chief
CNA	Computer Network Attack
CND	Computer Network Defense
CNE	Computer Network Exploitation
CNO	Computer Network Operations
DOD	Department Of Defense
EW	Electronic Warfare
FIWC	Fleet Information Warfare Center
JIOC	Joint Information Operations Center
INFOSEC	Information Security
IO	Information Operations
IW	Information Warfare
MILDEC	Military Deception
NIPRNET	Non-secure Internet Protocol Network
NIWA	Naval Information Warfare Activity
NR	Naval Reserve
OPSEC	Operational Security
PA	Public Affairs
PSYOP	Psychological Operations
RNVR	Royal Navy Volunteer Reserve
SIPRNET	Secure Internet Protocol Network
TARBS	Transportable AM/FM Radio Broadcast System

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I. INTRODUCTION

> Truth is so precious that she should always be attended by a bodyguard of lies.
>
> Winston Churchill

A. FUTURE WARFARE AND INFORMATION OPERATIONS

Information Operations (IO) is Information Warfare (IW) conducted in all engagement phases from peacetime through conflict. It consists of Military Deception (MILDEC), Operational Security (OPSEC), Psychological Operations (PSYOP), Electronic Warfare (EW), Physical Attack/Destruction, and Computer Network Operations (CNO) (Ref 8, p. II-3-5). Presently, the Navy is concentrating on EW, OPSEC, MILDEC, Physical Destruction, and Computer Network Operations. The Fleet Information Warfare Center (FIWC[1]) is also expanding into PSYOP with systems such as the Transportable AM/FM Radio Broadcast System (TARBS) but is having difficulty developing operational procedures due to limited manning and few skilled PSYOP personnel. The Navy has much to offer in the softer side of IO but fails to realize the complexity of PSYOP. PSYOP is more than just high technology (Ref 1, p. 70). Personnel manning is the most vital factor in every facet of IO and this resource is not being optimized. Properly trained personnel in the core competencies of IO are critical and the Naval Reserve FIWC (NR FIWC) organization must be expanded and effectively utilized to meet the demands of the fleet.

[1] Pronounced fī wick

The future of warfare may predominantly involve IO with many developing countries looking at ways to oppose the United States in an unconventional asymmetrical manner. Desert Storm demonstrated that confronting the United States military in a conventional symmetrical manner will not succeed.

> Such a war is unlikely to recur because the perpetrator must deploy immense numbers of troops and will suffer enormous losses from American firepower (Ref 2, p. 218).

Future battles involving large conventional forces such as major tank engagements seem unlikely in the years ahead. However, lower intensity conflicts could become the norm and warfare may be primarily conducted through media and networks on the information plane.

Since the advent of the Information Revolution and the rise of the INTERNET as a primary communication medium in the business world, the awareness of Information Operations has grown significantly beyond the Department of Defense (DOD), which has always verified its importance:

> Information systems have become essential ingredients to the success of combat operations on today's battlefield (Ref 3, p. 55).

Protection of these systems from the plethora of potential future attacks has become a high priority. IO does not singularly exist within computer networks but within all information providers and exchanges such as the mass media through Public Affairs (PA) and personal interaction through Civil Affairs (CA) personnel.

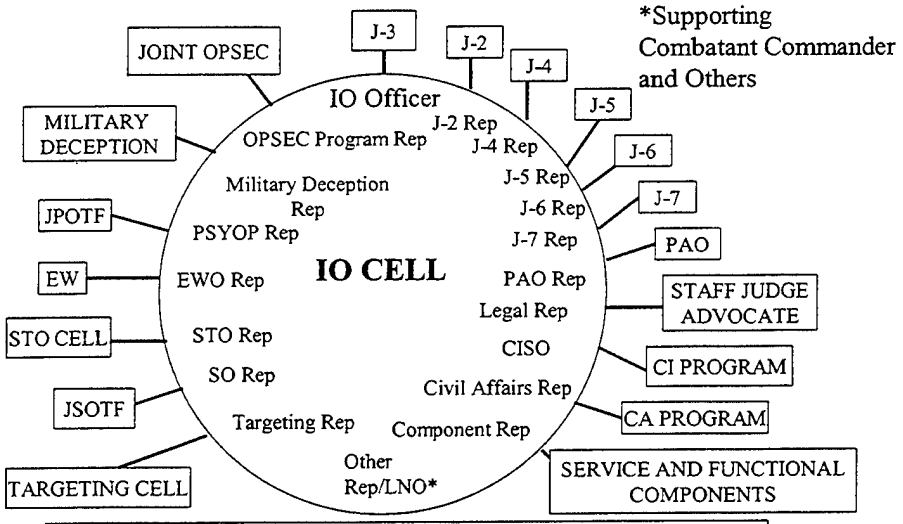
Cyberspace and information media have become the new battlespace, which drives the need for personnel with high levels of education and training. Personnel with

technical backgrounds are being drawn away from the military services due to the high demand of the civilian world and the offer of high salaries. In the Information Technology (IT) field, this is even more extreme with personnel receiving their training in the military and then leaving the service for the civilian job market. Officer and enlisted salaries are not sufficient to retain these individuals on active duty. However, many do stay in the reserves after they separate from the service. They have successful careers as computer consultants, computer programmers, computer engineers, information technology managers, computer security specialists and consultants. Others have advanced degrees in psychology, history, political science and other social science disciplines along with business personnel with years of marketing and sales experience. These individuals could form a strong support structure of IO expertise for the Navy both in peacetime and surging for conflict.

B. INFORMATION OPERATIONS INTELLECTUAL CAPITAL

In finding personnel to support the needs of Navy IO, the type of individual capable of conducting IO must be identified. This research is focused on historical evidence to see how IO personnel were obtained and how activities were conducted in the past through the history of deception operations. These operations give tremendous insight in how to improve IO operations today by examining feats of deception conducted during past conflicts. Individuals such as Dudley Clarke and his 'A' Force during World War II which ran the deception operations in the Mediterranean and Colonel John Bevan, who coordinated deception operations in London for the Allies are a few of the characters that need to be explored to find out what makes an IO expert.

This research aims at answering several questions: (1) What are the skill and education requirements for IO personnel? (2) Are there civilian equivalent careers that support the IO skill set? (3) How can Naval Reserve personnel effectively support IO warfighting? This research hopes to improve IO organizations such as IO Cell support shown in figure 1, by emphasizing the need for optimizing the available talent to support IO warfighting through the use of personnel in the Naval Reserve Force. The key link to IO success is in the support of FIWC to enhance its ability to perform full spectrum IO by expanding the utilization of Naval Reserve Forces in areas such as the unique skills and talents the Naval Reserve Force can provide.



CA	Civil Affairs	LNO	Liaison Officer
CI	Counterintelligence	OPSEC	Operations Security
CISO	CI Support Officer	PAO	Public Affairs Officer
EW	Electronic Warfare	PSYOP	Psychological Operations
EWO	Electronic Warfare Officer	REP	Representative
JPOTF	Joint PSYOP Task Force	SO	Special Operations
JSOTF	Joint SO Task Force	STO	Special Technical Operations

Figure 1: Information Operations Cell (From Ref 8)

II. HISTORICAL REFERENCES TO INFORMATION OPERATIONS

The lie is so precious that it should be flanked with an escort of truths

Brigadier Dudley Clarke

A. HISTORY OF INFORMATION OPERATIONS

Extensive deception operations were conducted in the past and the Navy should learn from history the methodology used and the personal attributes of those involved. This chapter investigates personalities in deception operations to determine what their characteristics and traits were in order to discover the profile of an IO officer. Through the characteristics of these individuals, future IO warrior characteristics can be extrapolated to the desired IO systems and concepts of today.

Information Operations bases much of its premise on Information Superiority through advanced communication networks. During the Napoleonic Wars, Admiral Horatio Nelson had information superiority over his opponent with an advanced communication system, which allowed Nelson to control his ships effectively in battle. The first alphabetic signal book developed by and named after Home Popham put a flexible, comprehensive, and instantly communicable range of signals at a sea commander's disposal (Ref 7, p. 49). The French had no such system and suffered severely during the Battle of Trafalgar. Lacking vital information, the French Admiral Villeneuve, lost all control of his forces and ultimately was defeated (Ref 7, p. 88). Prior to the Battle of Midway, the United States Navy broke the Japanese code, which allowed the Navy to read Yamamoto's battle orders which gave the United States a good indication of when and where the Japanese would strike (Ref 7, p. 186). A careful examination of history demonstrates that information superiority is a key ingredient that

has always been a factor in warfare. Protecting information flows and gaining information superiority has long been part of warfare and was just as critical 200 years ago as it is today. Warfare has only changed in that information moves faster and there are more avenues for information to travel.

The establishment of IO has merged pre-established concepts and supporting functions such as Psychological Operations, Military Deception, Operations Security, Public Affairs, Civil Affairs, and Electronic Warfare. The creation of computer networks has brought Cyberspace into the warfare role with Computer Network Operations. The synergistic goal of IO, however, is that it:

> Involves actions taken to affect adversary information and information systems while defending one's own information and information systems (Ref 8, p I-1).

The British, during World War II, synergized their efforts and were able to utilize information to affect the German decision-making process. They used "turned" double agents against the Germans for the enhancement of security and to deceive the enemy (Ref 9, p. 37). The Enigma code-breaking machine was used to break through Germany's information security, which allowed the British to read secure German traffic. The British also used active deception techniques to shape German perceptions of reality by planting false letters on a body during OPERATION MINCEMEAT (Ref 9, p. 143-150). British operations used every sort of information warfare tactic with the exception of Computer Network Operations since it had yet to be invented.

1. Orchestrators Of Information Operations

The Allies had an impressive IW organization during World War II which paid great dividends and helped defeat Nazi Germany. They formulated the first integrated

IW organization out of sheer necessity in order to coordinate operations at the urging of General Wavell and Brigadier Dudley Clarke (Ref 10, p. 50-51). The participants referred to the art that they conducted as strategic deception. Today, it would be viewed as full spectrum IW. These wide ranging and highly secret organizations managed to fool the Germans time and again as to what the Allies were planning.

These early IW organizations were primarily made up of personnel who were not regular military officers but rather,

> A collection of uniformed civilians ranging from Dennis Wheatley-bon viveur, man-about-town, gentleman vintner, and author of popular thrillers and tales of the occult- to "stockbrokers to manufacturers of soap to a small part character actor"(Ref 10, p. 51).

These unique individuals were fairly flamboyant and could be considered adventure seekers who seemed to have enjoyed conducting these very special operations (Ref 10, p. 51). Their organization was a network set up by the British in World War II and coordinated by individuals such as Brigadier Dudley Clarke, Colonel John Bevan, Lieutenant Commander Ewen Montagu, and many others. They all had similar traits in personality as schemers and planners with the skills to manipulate and deceive.

Colonel Noel Wild led the IW efforts in Operation OVERLORD with his Ops B staff (Ref 10, p. 53). Their operations encompassed the full range of Information Warfare under one commander: The use of EW in the bombing attacks on German radar installations which knocked out all except for the Pas de Calais radar; Deception and PSYOP which included the heavy bombing of the Pas de Calais area, the establishment of the First United States Army Group (FUSAG), a decoy army, under Patton; the utilization of Counter-Intelligence by feeding double agents information to pass to the

Abwher, which convinced them that a landing was taking place at the Pas de Calais; OPSEC, which kept this operation entirely hidden from the enemy by effectively compartmentalizing the operation; and exploiting the communication and information structure of the Germans by breaking the codes.

> One essential ingredient in Clarke's plans was the information derived from Ultra, since it was only through the reading back of the German signals decoded at Bletchley Park in England that he could tell whether the cover plan was working and whether any of our agents had been blown (Ref 11, p. 101).

Full spectrum IW of the day was conducted over all information media available to convince the Germans of the attack on Pas de Calais.

a. Skilled Civilians in Camouflage

The British recognized the skills of civilians in uniform and did not treat them as:

> Long haired artists in uniform but as specialists who could make an important contribution to the battle (Ref 12, p. 95).

They recruited artists, architects, and film producers and directors as camouflage and deception experts.

> They were lucky in the small unmilitary group of artists, architects, and film producers who arrived in Cairo in the early part of 1941-men not only with artistic vision but also able to use materials with imagination (Ref 12, p. 95).

These individuals had a unique understanding in staging the art of deception and the concept of color and contrast to hide movements in order to deceive and to make military equipment appear invisible. During the North Africa campaign, these camouflage

experts were challenged with finding ways to hide tanks and other vehicles from German reconnaissance planes and bombers. They derived the idea to use ten tons of rotten Italian flour and two thousand gallons of Worcestershire sauce unfit for human consumption mixed together to form a thin paint. This mixture gave the vehicles the look of sand and effectively camouflaged them from the Germans. They also created dummy artillery pieces from old petrol tins, cement, tubular scaffolding, and netting to conceal artillery pieces. Also, buildings were painted with darkened areas to suggest bomb damage (Ref 12, p. 97). The lesson learned in this operation was that

> Camouflage was too complex to be left to amateurs (Ref 12, p. 97).

In order to be effective in these creative operations, officers and men would have to be trained in several technical aspects, and senior officers would have to understand what was meant by terms such as disruption, background, behavior, counter shading, the interpretation of air photographs and deception (Ref 12, p.97-98). Military personnel are not trained in art concepts. However, because of their non-military background these civilians in uniform understood these concepts and were able to derive seemingly unconventional ideas that worked effectively.

b. Lieutenant Commander Ewen Montagu, Royal Navy Volunteer Reserve (RNVR)

LCDR Ewen Montagu, RNVR, the author of the "Man Who Never Was" and one of the masterminds behind the Sicily invasion deception plan as well as a major player in the Normandy cover plan, was a barrister[2] before the war.

---

[2] Lawyer

> It was a marvelous piece of luck that the officer who handled naval 'Ultra' happened to be, in civil life, a barrister, trained to see the point of view, and anticipate the reactions, of an equally acute opposing counsel (Ref 9, p 9).

The organization which Montagu joined, the RNVR, was established before the war, and formed a supplementary reserve organization from civilians who had some basic nautical skills. Since Montagu was a sailing enthusiast he figured that the RNVR was for him and when he was called to duty, it was discovered that his civilian experience as a barrister should be brought to good use for the Royal Navy. He was sent to the Naval Intelligence Department and promoted to Lieutenant Commander. From there, his skills and talents were used to run double agents in Britain and to help form several deception plans against the Germans (Ref 9, p 16-22). One operation that he orchestrated, Operation Mincemeat, was to devise a plan to deceive the Germans of the obvious invasion of Sicily, and to convince them into thinking it was going to occur in Sardinia and the Balkans. The operation called for a body to be "planted" where the Germans could gain access to the corpse's parcel of false plans for the invasion of Sardinia and the Balkans. They used ingenious ideas to create a fictional staff officer, Major Martin, by creating a credible past with a girlfriend and even indebtedness. Montagu's group placed personal letters on Major Martin between two high-ranking flag officers with joking references to "Sardines" to convince the Germans that an invasion was going to occur in Sardinia and not Sicily. However, the planted material had to be subtle so as not to draw suspicion. When a submarine delivered the body and it washed ashore in Spain, the Germans were able to get access to the briefcase that held the letters and believed the information because the character that was carrying the letter was credible and the information was not blatantly open about the operation (Ref 9, p 143-150).

c. Colonel John Bevan, Royal Army

Colonel John Bevan was an investment banker in civilian life and became the second Commander of the London Controlling Section (LCS) after the first commander asked to be relieved due to lack of political support (Ref 10, p. 50). Colonel Bevan was very well connected politically and became the ideal officer to lead the section. Being married to the daughter of an Earl and having a Field Marshal as a brother in law was certainly beneficial. Even more influential was his friendship with Churchill's Chief of Staff, General Hastings Ismay and the Chief of the Imperial General Staff, Field Marshal Sir Alan Brooke (Ref 10, p. 51). This gave him the distinct advantage of getting the visibility needed to get operations approved and to be heard at the highest levels.

d. Colonel Newman Smith, United States Army National Guard

Colonel Newman Smith had intermittent military experience as an enlisted man in the Philippines, fought with General Pershing in World War I as an officer in the National Guard commanding a machine gun battalion, and was a banker and financier. He became the head of the Joint Security Control (JSC) for American strategic deception as the American counterpart to Colonel Bevan.

e. Lieutenant Commander Harold Burris-Meyer, United States Naval Reserve

LCDR Harold Burris-Meyer was the head of the Navy directorate at the JSC. He was a professor of theater and director of research in sound at Stevens Institute and worked in developing the sound for the movie Fantasia. He put his talents to work in developing sonic deception equipment for the Beach Jumpers (Ref 10, p52).

f. Lieutenant Douglas Fairbanks, JR, United States Naval Reserve

Lieutenant Douglas Fairbanks, JR, USNR, a popular actor of the1930s, joined the Navy during World War II. After serving time at sea, he was transferred from sea duty to Lord Mountbatten's Staff with the Royal Navy. There he observed British Commando operations and even trained with them, and after going on a few amphibious raids, he developed the idea for creating a tactical deception unit for the Navy following similar guidelines of the British Commando Units. After convincing the Amphibious Group Commander in the Atlantic, his idea was forwarded up the chain of command to the Chief of Naval Operations (CNO) office that created the first Beach Jumper Units. These units saw action in the Mediterranean Sea and were crucial in diverting numbers of enemy troops from the main invasion points. This unit further developed into the Fleet Tactical Deception Group and eventually became the Fleet Information Warfare Center today (Ref 13).

2. Commonality Among The Deceivers

What is most notable by the majority of the officers conducting deception was that they generally were not regular military. The exceptions were leaders such as Brigadier Clarke, Colonel David Strangeways and Colonel Noel Wild (Ref 10, p. 54). Several other regular military officers were present but were generally in the minority. This was because Clarke staffed "A" force with:

> Sprigs of the Establishment, male and female, preferably with something colorful about them, and with people of somewhat flashy accomplishments, such as a famous racing driver (Ref 10, p. 51).

Reservists and civilians in uniform dominated the deception organizations.

Since most were civilians and many were well connected politically, it gave these individuals a unique perspective and capabilities to conduct IW on the different levels from strategic to tactical. These political connections were beneficial in that IW/IO has a strong political element with the politicians heavily involved in the flow of information. Prime Minister Churchill's referencing of certain goals and objectives in speeches assisted the deception plan and Colonel Bevan's connection greatly benefited the organization.

With these operators of deception in the past being mostly civilians in uniform, the use of the Naval Reserve force to support IO should be apparent. The Naval Reserve Force is the link to the civilian world with civilians putting on uniforms one weekend a month and utilizing their specific expertise, developed in the civilian world for use in the active military. Many have the similar characteristics of the deceivers of the past and may be the IO warriors of the future.

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III. THE NAVAL RESERVE

> Employment of the capabilities of the Total Force (active, reserve, guard, and civilian members) increases the options for the commander and complicates the choices of our opponents.
>
> Joint Vision 2020

A. NAVAL RESERVE BACKGROUND

The Naval Reserve Force was established in 1917 as an augmentation force to active units and to backfill the frontline forces while the country mobilizes for war. These individuals are doctors, lawyers, salesmen, teachers, grocery store managers, advertisers, computer programmers and other professionals who give up time to serve their country. One weekend a month they drill at a reserve center or facility completing four four-hour periods following the guidance in their training program. A vital part of our defensive readiness posture is having these individuals on short notice to fill vital support missions to the fleet.

The Naval Reserve Force, however, is still essentially being operated the same way it was over 80 years ago when General Pershing was assembling the American Expeditionary Force in 1917 (Ref 14, p. 54). It consists of over 150 Naval Reserve Centers throughout the country in every one of the 50 states and several territories (Ref 15). These centers are where the majority of the reservists conduct their weekend training every month, with some conducting this training at their gaining commands such as Naval Reserve Force ships. Annually, reservists must go on active duty for a period of between 12 –17 days referred to as Annual Training (AT), and can either be completed at the command where they would be activated or another active duty organization. This

entire training period is often insufficient to train individuals in many areas of warfare required to maintain a significant level of proficiency.

Rather than train in this format, reservists could perform functions related to their civilian careers. Naval Reserve officers generally fill billets related to what they did on active duty, however, many have not driven a ship, launched a missile from combat, or conducted a damage control drill in several years. It is not uncommon for a computer analyst to have a billet as a reserve maintenance officer of a Shore Intermediate Maintenance Activity so that he or she is in a paying billet. The Navy could use this computer analyst in a better way.

B. USE OF RESERVES TODAY

The use of the reserves has been expanded today to provide contributory and direct support to active forces in times of crisis. The rotation of reserves to Bosnia is a regular operation and reserves are activated for six-month recall to fill watch officer positions as requested by the regional Commander's In Chief (Ref 15). This is critical because this is an area where the military can utilize skilled personnel that it cannot fill by hiring middle managers from the civilian world as lieutenants. Time is needed to train military officers and the system is not designed to cross civilians from the commercial sector into the military at the mid-grade officer level because they have to be trained from the bottom up within the organization. The civilian world does not have this restriction upon it and regularly draws on experts from other companies to provide new impetus and to bring in new ideas. The only place where the Navy can draw such assets is from the Naval Reserve Force on active duty recall or special work assignments. For example, Captain Menez is on a three-year active duty recall as the Chief Information Officer of

the Naval Reserve Force to provide Information Technology expertise that he acquired in the civilian sector (Ref 17).

The reserves have been taking the lead in several mission areas due to fiscal constraints. There has been a political shift away from defense spending toward budget-deficit reduction. This is driving a new dependence on Naval Reserve assets and capabilities to meet the Navy's peacetime commitments (Ref 16, p. 55). Units such as the Marine Inshore Undersea Warfare Units, Inshore Boat Units, and Composite Naval Coastal Warfare Units provide unique services to the fleet such as harbor defense that are only offered by the Naval Reserve. With the prevalence of computer expertise in the reserves there may soon be a trend in shifting the computer forces of the future to the reserves. In December 2000, Department of Defense released the fact that the Reserves would play a much larger role in Information Operations due mainly to their skills in Information Technology. According to Deputy Defense Secretary Rudy DeLeon,

> Members of the Reserve and National Guard are often way ahead by the very nature of their civilian employment, trained in their workplaces to exploit technology (Ref 18).

Reservists work for major technology firms that are driving the speed of connectivity and advanced software development such as Sun Systems, Cisco Systems, and Microsoft. Computer Security and reliability of information systems are critical to their success in business and even more so with telecommunication companies such as ATT, Nortel, SPRINT, and MCI who must have reliable and secure systems to protect themselves from attack or manipulation. Granted that phone lines are often stolen but telephone companies must maintain a high degree of reliability in order to stay in business (Ref 3, p. 158). Security and reliability of computer systems in the civilian world require just as

much durability and reliability as military systems. If a corporation like SPRINT cannot maintain reliable connectivity, it goes out of business. The personnel who maintain these systems are what the Navy needs for supporting CNO.

Retaining officers who separate from active duty in the reserves is the starting point in keeping their talents within reach of the military. As these officers and enlisted personnel gain civilian experience and advanced education, the Navy can use these new found talents for its own purpose. This is already being done in the Naval Air Reserve with airline pilots flying P-3s, C-130s, or C-9s during their weekend drills (Ref 15). Naval Reservists solve difficult problems in their civilian professions and can bring that expertise to the Navy. Activating Naval Reservists for short periods of time to work on Active Duty for Special Work, which is a funding program to bring in reservists for periods of six months to three years at a time, would be beneficial to places like the Naval Postgraduate School where the Reservists could teach what they have learned in the business world.

1. Joint Reserve Virtual Information Operation (JRVIO)

The military has already seen the need to use reservists in IO by creating the Joint Reserve Virtual Information Operations (JRVIO) organization to provide support for Joint Commander's in Chiefs (CINC), Information Operations Technology Center (IOTC), and National Security Agency (NSA). The hope in this organization is that it may generate cost savings to possibly improve recruitment and retention of highly skilled IT professionals and reduce the need to rely on contractors (Ref 19 p. 2). It will primarily start in the form of watch standing and other qualifications for their weekend drills at the various bases. The JRVIO will not be a fixed unit but reservists provided from all the

separate services reserve forces scattered throughout the country that will only work for Joint Commands and not the individual services. The unit will also be loosely controlled by a single commander but they will still belong to their respective services.

The organization will be centered on three groups for the IOTC; Community Coordination Group (CCG), Analysis and Assessment Group (AAG), and Advance Technological Group (ATG). The CCG will be involved in technological sharing, requirements coordination, and Planning, Exercise and Operations Support. They will be overseeing technology and technical data exchanges between developers and customers. The AAG will conduct Systems and Vulnerability Analysis, Modeling and Simulation, and Technical Analytic Support. The ATG is to provide technology analysis, technique development and technical support. Similar requirements have been delineated for duties to the Defense Information Operations Group at National Security Agency (NSA), Joint Information Operation Center (JIOC), and Defense Information Systems Agency (DISA). The main disadvantage of these groups is that they will not be a single unit but scattered about the country on different weekends. This drives up the cost of travel that could be used to fund and support other Information Operations initiatives that provide the Navy with Information Operations support. With the reservists scattered to different commands, unit cohesion will not exist and their ideas are not being fostered within a designated unit to solve problems for the fleet. Keeping reservists in units together will allow the reservists to generate new ideas on approaching Information Operations while keeping their thinking "out of the box." IO units will also allow reservists to provide services to the service arms and Joint Commands without having to spend money for travel and housing costs for they could do it virtually. Virtual support is the long-range

plan for the JRVIO and the money saved could be turned around to pay for equipment for the NR FIWC organization (Ref 19). Ships and mobile units require extensive Information Technology (IT) support for their LANs and other computer technology systems. These systems are more susceptible to attack due to poor management, improper use of or lack of firewalls, and other system related problems and the Naval Reserve can support these areas. The United States Army Reserve (USAR) has already realized this fact and is establishing IO centers throughout the nation to utilize the IT/IO expertise of their reservists (Ref 35, p. 14-15).

The JRVIO is initially utilizing reservists primarily as computer watch standers and not in the other areas of IO where they can provide support. The long-range plan for the JRVIO, however, is to support full spectrum IO (Ref 19). The final report on the JRVIO also states that the long-range goal is to provide support to the Joint Commands through the reliance on virtual operations (Ref 19, p. iv). This idea entails utilizing the INTERNET or Secure Internet Protocol Network (SIPRNET) to connect reservist to perform their duties remotely. The utilization of Public Key Infrastructure (PKI) technologies is also being investigated which may alleviate the need for SIPRNET. This will allow reservists in remote locations to participate in the program who do not have SIPRNET access in their specific reserve center or drill site.

Virtual organizations can lead to several challenges as identified by the JRVIO working group:

> Creating a "virtual organization" would present a set of unique challenges including how to monitor unit and individual performance, how to ensure sufficient security measures for unit equipment and personnel, and how to retain quality personnel over the long term (Ref 19, p 2).

The concerns of the JRVIO can be alleviated by utilizing existing reserve units for IT/IO personnel with computer Local Area Networks (LAN) with INTERNET access and secure facilities. These units could be located at reserve centers to conduct IT/IO missions and commanding officers could evaluate performance, ensure security measures for equipment and personnel, and handle retention problems for the unit. These units, however, will primarily provide services to their own branch services but also support the JRVIO infrastructure. NR FIWC is one such organization that could perform this mission.

2. Naval Reserve FIWC Organization

FIWC does have a Naval Reserve augmentation unit and a detachment located at Navy and Marine Corps Reserve Center Norfolk VA and Naval Reserve Center San Diego respectively. These units are not utilized to their fullest potential due mainly to an out of date manning document and training plans. The training plans indicate only minimal IO training with a single 20 hour CD-ROM course on IW. The unit and detachment in total consists of 36 officers and 84 enlisted personnel (Refs 31 and 32), which is a large reserve support force that has potential to support FIWC in CNO, PSYOP, MILDEC and Civil Affairs. These personnel are already paid for by FIWC and could be used to provide a return through usage in IO.

These units originated out of the same organizations as FIWC but have not been reorganized to support modern IO as FIWC has. The NR FIWC reserve manning document indicates a major focus on Electronic Warfare and very little in CNO, PSYOP, Deception and no CA support (Refs 31 and 32). Training guidance is inadequate in that many training plans have not been updated for some time with few specialized IO

training requirements. The reserve management system cannot place effective or desired individuals into these billets because the manning document and training plans do not indicate desired IO skills other than Electronic Warfare (Refs 31, 32, and 33). These documents also drive school requirement justification and other training that could be provided from reserve funding to train FIWC reserve personnel. Proper delineation of required skills will assist reserve management in identifying personnel with the needed skills that FIWC desires. Training plans are the main indicators of the readiness of Naval Reserve units and being out of date and inaccurate impacts the overall readiness of FIWC. Updating these documents should be of a highest priority. FIWC's Reserve Liaison Officer (RLO) is working with the reservists in the local Norfolk unit and is in the process of updating the manning document and the training plans (Ref 34).

Using reservists to directly support the active forces has become a reality in future defense planning. JRVIO and contributory support missions are initial means to utilize IO resources that are found in the reserves. Expanding the FIWC reserve organization into an IT/IO organization to support the JRVIO initiative can solve many of the problems that are delineated in Reference 19. Concentrating these individuals in detachments will also make their talents accessible to the Navy for more efficient and effective use. Requirements, however, need to be established as to what skills are needed by the active forces before the NR FIWC manning document and training plans can be effectively rewritten.

IV. SKILL REQUIREMENTS FOR INFORMATION OPERATIONS

A. INFORMATION OPERATIONS SKILLS AND THE RESERVES

The breadth of Information Operations ranges from the newest technology to the oldest concepts of psychology and human nature. Training and education are critical in developing extremely diverse individuals with the ability to understand both technical and conceptual ideas to conduct integrated IO. The Naval Reserve has personnel with experience in IO related professions giving them an advantage because they pursue this IO related career full time. The military, in turn, can use that skill and education to serve its needs. The principle skills that are required of Information Operations experts are computer oriented skills including networks, operating systems, and programming, understanding advanced physics and engineering, social science knowledge in human nature, cultural diversity, linguistics, psychology and sociology, and military understanding on how to integrate these facets into a conceivable plan to influence the decision making process of an opponent. Intangible skills such as guile, cleverness, creativity and imagination cannot necessarily be taught and may be inherent in the individual. These skills must be identified by senior leadership such as Rear Admiral John Godfrey when he discovered Ewen Montagu's talents during the Second World War (Ref 9, p. 27).

Though Joint Pub 3-13 does not directly identify skill sets, it does imply what the personnel in the IO organization must be able to do in preparation of the battlespace. Of the six areas listed in Joint Pub 3-13 five are critical in defining skill requirements for IO such as:

> Knowledge of the technical requirements of a wide array of information systems (Ref 8, p. II-12).

This specifies an individual with extensive knowledge of computer and information systems and personnel on active duty may not obtain experience with multiple information systems with Navy focus on IT21.

Not all mission areas of IO are transferable to the civilian world and certain skill sets are more fully developed in the Navy. The IO cell will be optimized with the synergy of frontline forces experience in Fleet operations with the reservists' abilities in Computer Network Operations, Psychological Operations (PSYOP), Military Deception (MILDEC), and Civil Affairs (CA).

1. Computer Network Operations

Computer Network Operations consists of three distinct areas. Computer Network Attack, Computer Network Exploitation and Computer Network Defense. These areas are distinctively different but all have the same common skills requirements in that individuals conducting such operations must have expertise in the areas of computer networks and even programming skills. With the INTERNET expanding at an exponential rate with 2 million new users entering every month, more and more individuals and businesses are becoming reliant on computers. The need for experienced personnel is a concern for the Navy to protect its systems and to potentially prevent an opponent from using theirs (Ref 4).

Computer Network Attack is operations:

> to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves (Ref 8, p. GL-5).

This requires personnel with skill and talents and a first-hand knowledge of how computer networks operate. The ideal personnel for such activities are those individuals who initially designed the programs such as the civilian employees of Microsoft, Oracle, and Cisco. They are prime candidates in understanding the weaknesses in their own systems through which to gain access.

Computer Network Exploitation is similar to attack but the object in exploitation is to not be noticed while exploiting the enemy's system so as to use the information for intelligence purposes. Exploitation is not discussed in the Joint Pub 3-13 but should be addressed as being different from attack.

> Professionals use stealth and superior skill to accomplish clandestine missions. Evidence of their activity is rarely detected (Ref 21, p 6).

Exploitation is more common in corporate espionage when copying data without being noticed is more beneficial because being noticed can leave a trail, thereby alerting the company that it has lost its secrets and may need to respond in kind (Ref 21, p. 163). This is similar to military exploitation because the information received will more likely be better intelligence if the opponent does not know that its plans are revealed.

The Allies conducted the exploitation of Axis information media extensively during the Second World War. This was done through exploiting the media of double agents and "feeding"[3] information to the Germans. Reading decoded messages in the

[3] Feeding was the term used in giving the double agents information. It is derived by whether or not the Germans "ate" the information as discovered by reading secret messages decoded by Ultra.

Ultra program further exploited their internal communication network to assess the success of whether the bait was "eaten." This exploitation of the German information network gave the Allies Information Superiority over the Germans (Ref 9, p. 36-45).

Computer Network Defense or Information Assurance (IA):

> Protects and defends information and information systems by ensuring their availability, integrity, identification and authentication, confidentiality, and non-repudiation (Ref 8, p. III-1).

This subject area covers intrusion detection devices, firewalls, virus scanners, encryption, and various other defense postures that are needed to protect information. The civilian sector produces the majority of these products such as Raptor firewalls and virus scanners such as McAffee and Norton. The military has already shifted to commercial off the shelf products to protect their systems. This is an indication that the Navy is not leading in computer technology but is only following the commercial sector lead. Since the civilian market is producing the security tools and hacker websites are places where hackers can share scripts on how to break into systems, there must be a way to obtain those skills for use in the Navy.

The reserve force has an advantage over the active forces in computer skills because many reservists work in these fields full time vice getting a shore tour in a computer field and then heading back to sea. Poor retention rates of skilled network personnel exacerbates the problem with the high demand for these skills in the civilian world along with the higher salaries:

> Expertise to run and maintain both the old and the new technology in the Navy's inventory is expensive, particularly when the Navy is losing many of its military and civilian experts to the private sector. This is happening because the private sector is better organized to constructively use the expertise; offering better corporate packages; using state of the art technology; demanding a great need for their expertise; and providing the necessary training that the Navy commands are unwilling or unable to provide (Ref 22, p. 63).

Figure 2 shows the number of Information Technology Professionals with Masters Degrees in the Naval Reserve as of 5 May 2001. Not all of these individuals have the skills required to be an IO expert in CNO but the pool is large enough to search for the right personnel.

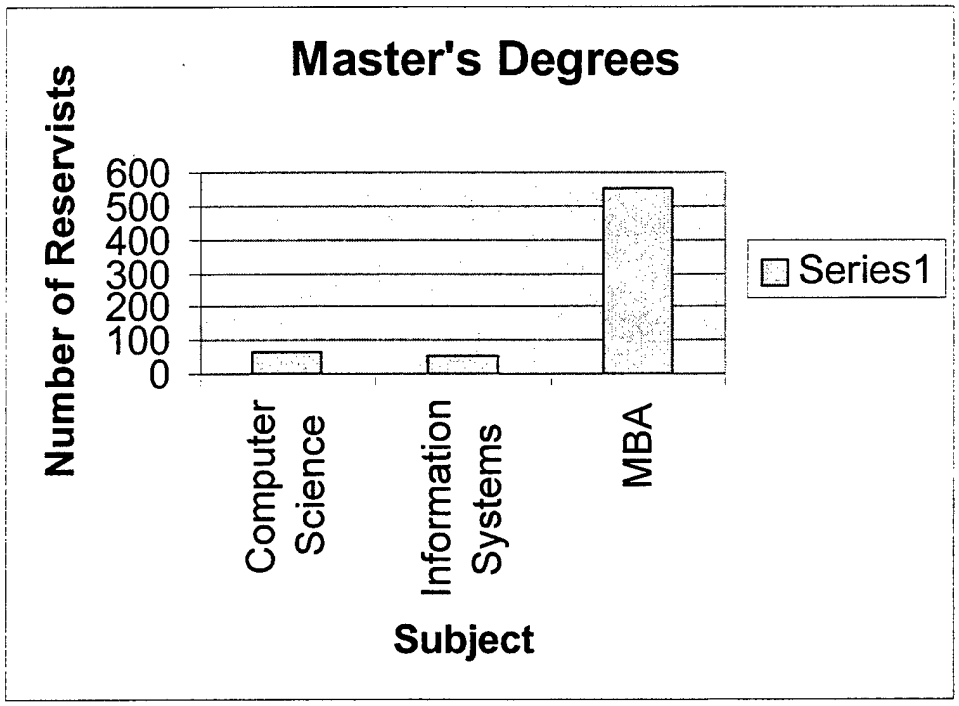

Figure 2: Masters of Science Degrees (From Ref 24)

With the increase of Computer Network Attack and hackers throughout the world breaking into computer systems such as Ardita[4], there needs to be a cadre of individuals with computer skills in the Navy (Ref 3, p 197-9). Advanced network training and computer language skills are hard to maintain if one is not working in the field continuously. Line officers must go back to sea to be competitive for promotion and restricted line officers have a similar rotation and must complete tours in successive billets in order to be competitive. Creating a new community has been suggested but this would not resolve the retention problem (Ref 22, p. 62). Trying to make personnel on active duty highly skilled in a market where the civilian world would lure them away from the Navy is not advantageous.

[4] Julio Cesar Ardita, hacker name (El Griton) hacked into the Harvard University computer system and from there further hacked into DOD, NASA, and other University sites in 1996. He was a 21 Year old Argentinean who was eventually caught through an extensive computer wiretap (Ref 21, p. 76-81)

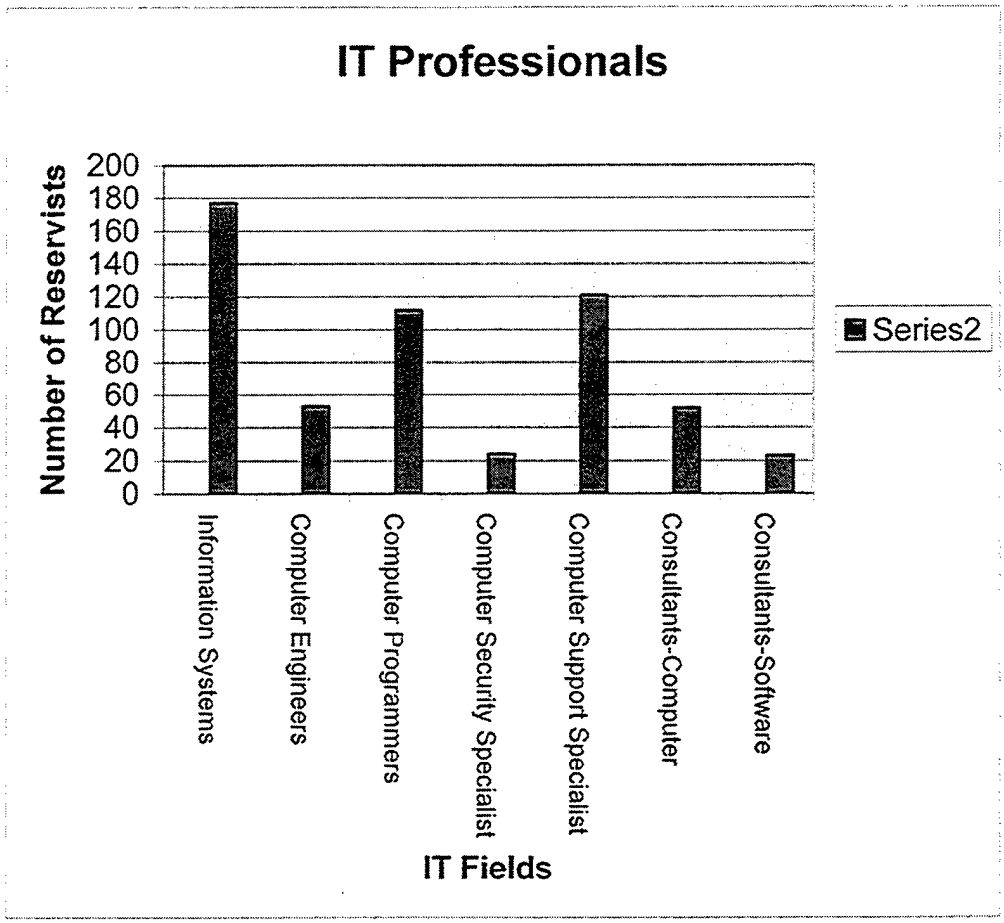

Figure 3: IT Professionals (From Ref 24)

The skills required are not specifically delineated but if it is extrapolated from reference 8, then we can assume that a computer expert must be able to do two things:

> Identify information systems value, use, flow of information, and vulnerabilities.
>
> Determine the most effective capabilities for affecting the vulnerable portion of the targeted information or information systems (Ref 8, p. II-1/2).

This implies that the person must know multiple computer systems and networks. The active forces are focused on IT21 and not the variety of other systems in the commercial sector (Ref 23, p. 24). Due to the nature of their civilian work, reservists have superior

knowledge of the variety of systems in use in the business world. They have a greater variety of computer specialties as Figure 3 shows and already have a significant number working in these fields. Utilizing reservists is cost effective because they essentially do not have to be trained nor paid full time and the civilian work experience makes them more effective.

What the active force needs is basic computer system training to conduct basic operations of the systems in use today. If Microsoft Certified Systems Engineering certifications are required then they should receive that training. To keep them in after this initial period, they should receive equivalent retention pay to balance the salary difference with the commercial world. This would keep the basic level of skilled personnel in the Navy to handle everyday business. The advanced security training for assistance and network design should be shifted to the reserves where the expertise is already there.

The Naval Reserve has the computer skill base on both the officer and enlisted levels to assist the Navy or to provide a Computer Incident Response Team support. Naval Reserve support to Computer Network Operations should be increased due to the expertise shown in Figures 2 and 3, which shows what many reservists do on a daily basis at their civilian jobs. Their specific skills are very refined and the Navy does not have to pay to train them since the civilian corporations have already paid the training costs. This is a nice turnabout for the military that routinely spends millions to train pilots only to see them leave for the commercial airlines. The civilian corporations can train these people and the military can utilize them.

2. Psychological Operations (Social Sciences/Communications)

PSYOP skills deal with both technical skills in radio communications and conceptual skills such as psychology, sociology, and cultural studies. The overall concepts of influence that include reciprocation, social proof, authority, commitment, consistency, liking, and scarcity are the basics of PSYOP (Ref 26, p. xiii). These are the influence patterns that the advertisers and marketers target to influence people to buy their product and PSYOP personnel use these theories to get an opponent to buy their story. Strategic PSYOP planning deals with the entire theater and the central message that is being circulated, while tactical PSYOP uses these ideas to create the way in which this influence is carried out.

> The skill requirement for Strategic PSYOP is related to the social sciences.
>
> PSYOP are actions to convey selected information and indicators to foreign audiences (Ref 8, p. II-4).

Therefore, personnel with advanced degrees in the social sciences can effectively support PSYOP. These individuals often have excellent understanding of the cultural, social, and psychological implications of an action and the likely reaction of an opponent. Personnel are needed who are trained in understanding the human psyche and cultural implications such as psychologists, sociologists and other human factors related fields.

> People from different cultures think differently (Ref 27, p. 11).

This is why cultural understanding is so critical and sociologists and cultural experts have just as important a role in PSYOP as psychologists. Together, these people will develop the overall PSYOP plan for the tactical personnel to carry out. They must ensure that the

products being developed by the PSYOP personnel are accurate and will relay the correct message.

> Strategies, which consciously or unconsciously disregard culture and other aspects of the human dimension in conflict invariably invite failure (Ref 27, p. 11).

The Reservists have skills and education levels in Strategic PSYOP as shown in Figure 4.

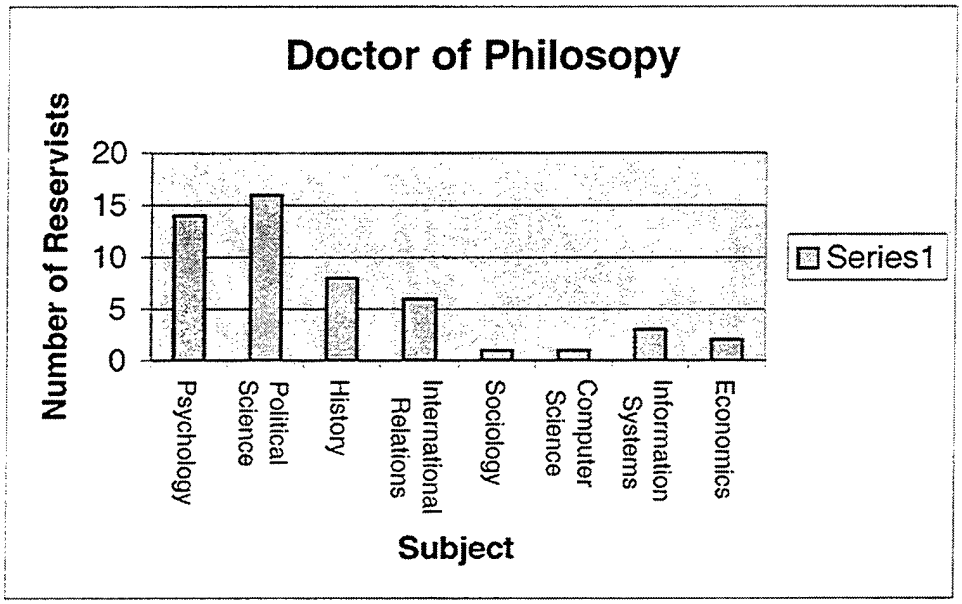

Figure 4: Ph. D's in Social Science Field from Ref 24

Tactical PSYOP require a creative outlook with artists developing the artwork and pictures to relay the message to the target audience, linguists to translate the message in the correct dialect, and personnel to deliver the message and to provide entertainment to the enemy in order to best sell the message that is being sent.

> Selection of media-and of course several may be used concurrently-becomes a complex task of estimating cost effectiveness of the several media alternatives (Ref 27, p. 13).

This accurately describes marketing and advertising career fields in getting the message to the right people, using the most cost-effective media, and relaying the right message. This talent is not developed in the military but is found in the civilian world as shown in Figure 5.

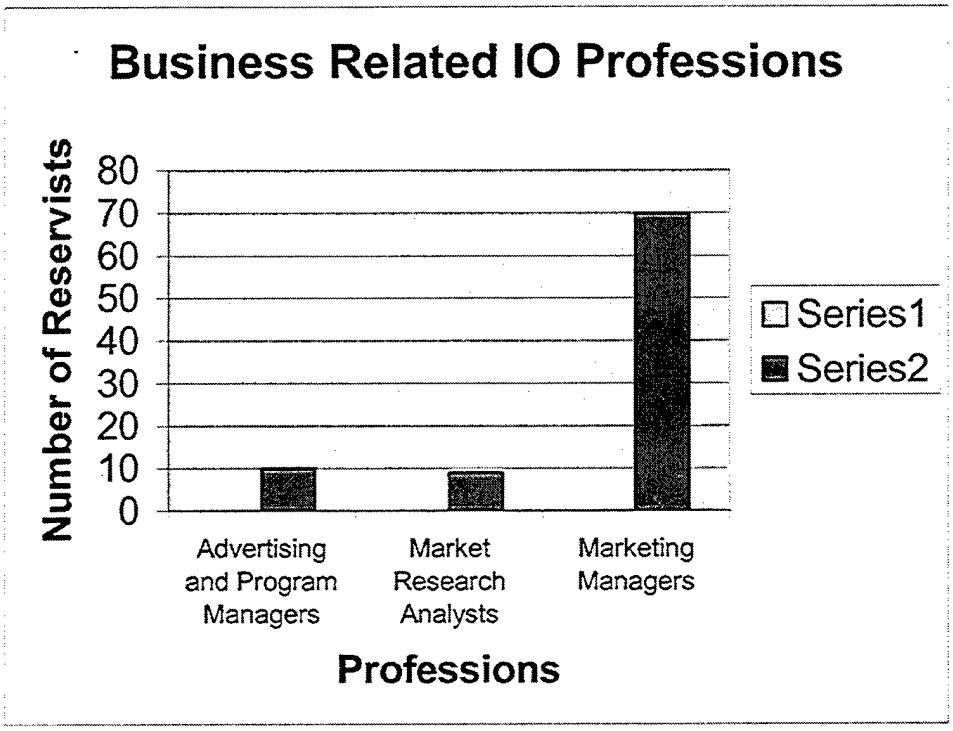

Figure 5: Business Related IO Professions (From Ref 24)

PSYOP operators also need to have tremendous amounts of creativity to come up with unique ideas on how to get the enemy to change the way they think. Artists that draw leaflets that send a message, scriptwriters who know how to tell a story, and producers who know how to bring the entire plan together can be effectively utilized to orchestrate PSYOP. These are skills that civilians in the broadcast and communications world use on a daily basis.

IO is all about telling the story and getting your opponent to believe it. Cultural experts can identify the proper media and message needed.

> If the message is encoded improperly according to culture, language, etc., (the human dimension), the message sent is invariably not the message received and Information Operations fail (Ref 27, p. 10).

What will offend the people and what will convince them to think in a different way are the main considerations. Producers and screenwriters can come up with the plan on how to create a viable scheme. They must be able to make it believable and have people accept it. This is also where advertisers and marketers come in, especially individuals involved in the international market. These talented and experienced professionals know how to sell things to people of different cultures. In many respects, IO is all about selling ideas vice selling products.

3. Deception

Deception is the old name for full spectrum IO during World War II. Today it is still a major component of intelligence work. Dudley Clarke's view was that the goal is to deceive the opponent. Make the enemy think in a certain way and to encourage them to respond in a certain manner (Ref 10, p. 52). Deception is an intricate building block of all of IO.

Strategic deception incorporates similar skills and backgrounds as PSYOP. Figures 3 and 4 are quite applicable to deception and many psychological techniques are used. The best description for the understanding of what strategic deception skill requirements are can be defined by Brigadier Dudley Clarke in two of his six rules on deception that:

1) All cover plans should follow not dictate the real plan. Any attempt to fit reality to the deception is doomed to failure.

2) All cover plans should be based on what the enemy himself not only believes but hopes for (Ref 35, p. 14).

These two rules follow the psychology of influence theories of commitment, consistency, and social proof. Everyone believes that the attack will land at one point, then the information is provided to reinforce this preconceived notion. Once the enemy is committed to this view, they will stand by their belief that that is what is going to happen. The understanding of these concepts is critical to planning and personnel in Figures 4 and 5 can be the core foundation for any IO organization.

Operational deception deals within theater deception plans and blends in closely with tactical deception in some aspects. 'A' Force and Brigadier Clarke were professionals at this and created phantom armies in the field to confuse German intelligence gatherers in constructing decoy airfields with decoy planes, supply dumps, motor pools, and encampments along with false troop movements announced through radio transmissions and other means (Ref 10, p. 49). They played an important role in fooling Rommel as to where Montgomery's main force was during the Battle of El Alamein (Ref 10, p. 49). The skills needed require knowledge of modern tactics as well as an understanding of what the enemy will be looking for so as to take advantage of these actions.

The mental attributes of the personnel who conducted IO during World War II is described in Chapter II. Skills such as those possessed by good lawyers who can out think his opposing counsels and who have the ability to step into the shoes of their opponents and see what he is visualizing are vital. Corporate America must out think

their competition in order to stay on top of product development, sales plans, and advertising, all of which utilize these concepts. It is not surprising that the majority of the London Controlling Section and Dudley Clarke's "A" force were civilian businessmen before the war (Ref 10, p. 51). The keys to their success were cunning, guile and an insightful understanding of Brigadier Clarke's theories and concept of operations.

4. Civil Affairs

The Civil Affairs (CA) aspect is an area of IO that has already shifted primarily to the Reserve Force. CA entails the four functional areas of government, economics and commerce, public facilities, and special functions, which range from public education, price control, public works, and environmental management. The single active Army CA battalion also has the added missions of dislocated civilians and cultural relations. These mission areas easily relate to the civilian world with businessmen understanding economics and business practices, teachers in education, public works with civil engineers, and environmental management with wildlife managers. These are skills that are not really conducive to the military with the exception of public works which is why the reserves have been assigned this mission.

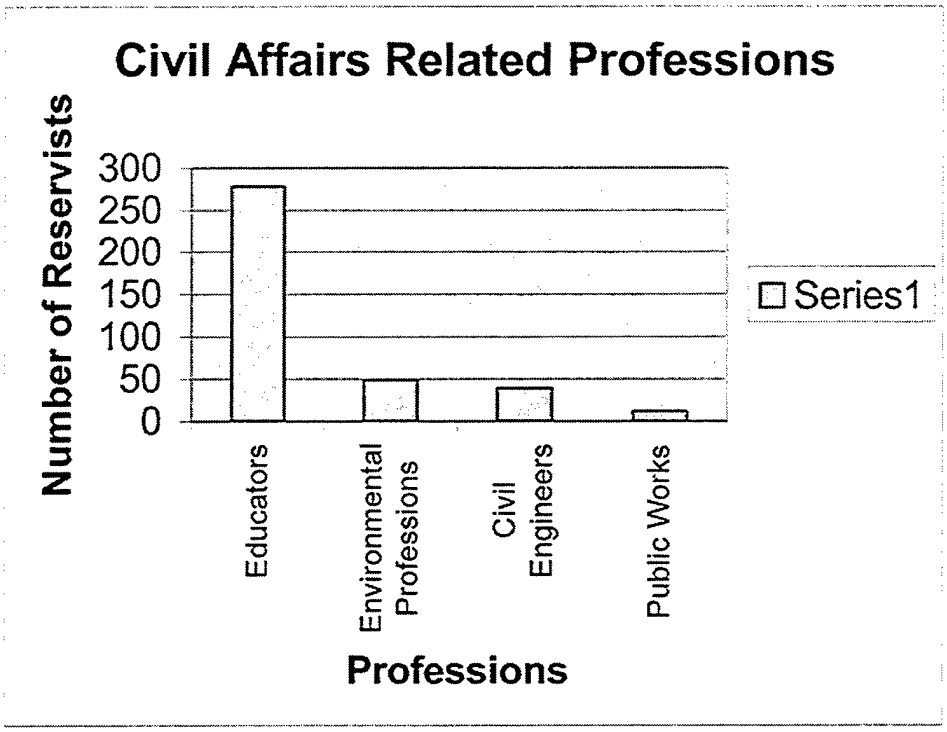

Figure 6: Civil Affairs Related Professions (From Ref 24)

Figure 6 shows the vast number of Naval Reserve personnel with careers in education along with numerous environmental professionals such as environmental scientists and technicians. Civil engineers from the Civil Engineering Corps can provide assistance in the area of public works such as the Navy Seabees to CA. Each of these mission areas can be supported easily with the use of the Naval Reserve Force. With the Navy not having a CA force, a Naval Reserve organization could provide ample liaison capability between FIWC and the Army Reserve CA commands.

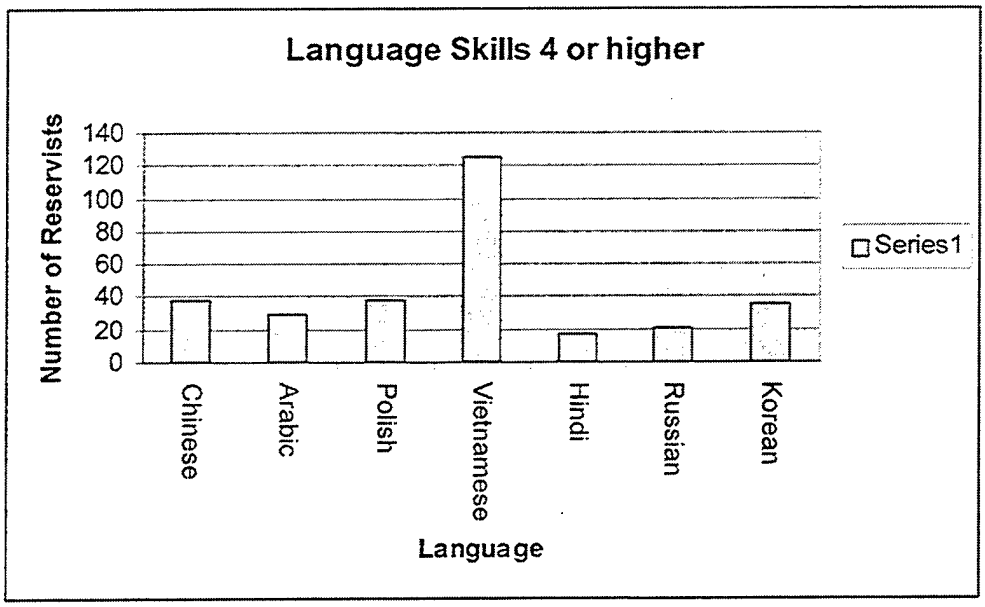

Figure 7: Language Skills 4 or higher (From Ref 24)

Linguistic skills are extensive in the Naval Reserve as shown in Figure 7. With critical needs in several linguistic areas such as Chinese and Arabic, the Naval Reserve maintains a large supply of these specialties. Language specialties such as Polish, Vietnamese, Russian, Korean, Hindi, and many other languages too numerous to list are commonly found in the reserves. This offers a core expertise in areas of the world where conflict may arise and the active military has not had the time to train linguists.

Army Reservists in CA have successfully performed missions during DESERT STORM, PROVIDE COMFORT, UPHOLD DEMOCRACY, MAINTAIN DEMOCRACY, JOINT ENDEAVOR/FRY, JOINT GUARD, and JOINT FORGE. They have already proven themselves to have the skills required to handle this mission area and do it effectively in current military operations.

B. RECRUITING

A Naval Reserve IO infrastructure must be organized to optimize the use of these specialized reservists so that the active forces can harness their skills. With an organization, the Naval Reserve can effectively recruit the desired personnel for the active IO components. Within the existing billet infrastructure of the NR FIWC organization, billets and training plans can be modified to identify these individuals so the right individuals can be placed in the right positions.

The main environment to find linguists, cultural experts, and social scientists are at major universities with students and professional academic personnel fitting many of the skills that are desired. The Army Reserve focuses its recruiting for reserve PSYOP and CA units on colleges for linguists and for communications personnel (Ref 28) because many of these students have the needed linguistic skills and cultural expertise of various areas of the world. Those studying China, for instance, generally have linguistic and cultural expertise in that area. They often have already traveled there and are familiar with the people and a few even have excellent political experience from their studies.

Another area of cultural expertise may be found is in the business world. International businessmen will also have the required skills along with linguistic and cultural knowledge with further advantage in understanding the psychology of influence. The advantage of both academic and business personnel are that their viewpoints are not affected by military thinking. They see people and cultures differently and have a different understanding of what will influence or affect them.

Colonel Noel Wild states that he thought that intellectually minded individuals (especially legal) were not the best civilian material for recruitment (Ref 11, p. 10). His discussion had to do with the idea that deception was not an intelligence matter but an operational one and he and Dudley Clarke were able to discount such ideas. The use of lawyers and intellectuals, however, proved successful in the case of Ewen Montagu and others in 'A' Force and the LCS. Wild's claim may be based on resentment of intellectuals since he himself was not one. Wild even had difficulty getting into the service in 1924 because of his fear of passing the entrance exam (Ref 11, p. 80).

Technological centers such as Silicon Valley, Seattle, and Atlanta to name a few are excellent areas for recruiting IO personnel. Corporations have the best and the brightest people working for them and these centers are locales, where active recruiting can take place. These locations also have large reserve centers where an NR FIWC detachment can be placed for the consolidation of prospective reservists. Consolidation will make it easier for the active duty military to utilize these resources.

As discussed, the Department of Defense has already discovered that the Reserve Forces have the required skill sets in the Information Operations arena and have begun creating a Joint Reserve Virtual Information Operations (JRVIO) organization. This is a start where the reservists with IO potential can go and provide their expertise to the Joint Forces. The services should follow this initiative and increase the utilization of the reserve IO infrastructure to service their own requirements such as the Army Reserve is presently doing.

This NR FIWC organization can take advantage of the skills the reserves already possess to provide service to the fleet. The JRVIO will not be utilized for support to the

Navy, only the joint commands. FIWC needs to expand its use of its Naval Reserve organization to consolidate IO talent to foster creative thinking for support to the Fleet. These units should be manned with reservists who have the talent base shown through Figure 2-7.

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V. NAVAL RESERVE IO ORGANIZATION

A. UTILIZATION OF NAVAL RESERVE FLEET INFORMATION WARFARE CENTER (NR FIWC) DETACHMENTS

FIWC's existing reserve force consists of the augmentation unit at the Naval and Marine Corps Reserve Center Norfolk VA and the detachment at the Naval Reserve Center, San Diego CA that are not being utilized to their fullest potential (Ref 34). This chapter will provide a clear idea of the capabilities and uses of NR FIWC detachments located in areas where reserve IO talent is concentrated so as to optimize acquiring personnel for direct support to FIWC and the Fleet.

1. Naval Reserve FIWC Detachments

NR FIWC detachments are a means with which to utilize the IO expertise in the Naval Reserve for support to the Fleet and even the JRVIO. The existing unit and detachment can be broken down into smaller and more manageable detachments that can provide both remote and local support to FIWC. With an already large manning structure of 36 officers and 84 enlisted personnel billets, detachments can be broken down easily into four separate organizations with two collocated with FIWC in Norfolk and FIWC detachment San Diego. The other two units can be placed in high technology centers such as San Jose in Silicon Valley and Atlanta optimizing the recruitment of reservists with extensive CNO experience.

The local detachments can use the existing services and capabilities at the active duty sites but the remote units will need to have their own facilities. Local Area Network (LAN), INTERNET access, SIPRNET and higher-level secure access depending on

missions assigned to the unit should be installed for their use. These assets need only to be in their local reserve center in which a Special Compartmentalized Information Facility (SCIF) with SIPRNET access can be built. This is needed due to the inherent requirement for OPSEC and Information Security (INFOSEC) in Information Operations. Accessing systems while conducting vulnerability analysis may accidentally result in a Top Secret Special Compartmented Information (SCI) discovery, requiring security to prevent public disclosure. These systems will also support virtual assistance to FIWC and Fleet CINCs, Naval Information Warfare Activity (NIWA) and the JRVIO.

Training and guidance should be conducted with agencies involved in similar operations to improve efficiency and effectiveness; however, the overall training will be done in the reservists civilian work experience vice fleet training. FIWC should train the reservist information and provide reserve personnel initial indoctrination on research and developments in IO. After that, FIWC will be able to draw upon these assets to provide support to missions and projects.

2. Naval Reserve FIWC Detachment Support in Computers Network Operations

Having virtual capability NR FIWC detachments can provide support in the form of CNO support or to provide assistance for web page design or even consultation. FIWC could use these reservists in their IT support shop, Red Team arena, Web Risk Assessment Vulnerability Analysis and Computer Network Vulnerability Assessment Team (Ref 5). Consultation and system assistance is what many of these reservists do during their full time careers and can provide this expertise to the Fleet through

Individual Duty Training Travel (IDTT) and AT support. FIWC can gather requests for contributory support and reservists can meet the needs when they drill on the weekend.

NR FIWC detachments will be able to provide support to the JRVIO remotely from their secure facility in their reserve center. For example, a watch shift could occur on a Friday night, monitored virtually from the reserve center, and continued on Monday morning. Watch bills and coordination would be the responsibility of the commanding officers of these units. The cost savings in travel alone will pay for the budget of the LAN system, workstations, T1 lines, and software.

3. PSYOP/MILDEC Support

FIWC could use reservists to support PSYOP/MILDEC operations, doctrine, tactics, area planning, and liaison with Army PSYOP and CA battalions for joint support. Naval Reservists educated in Psychology or the social sciences are what are needed to man these detachments to support these areas. Supplying FIWC with linguists, artists, cartoonist, broadcasters, advertisers, psychologists, sociologists, and anthropologists would expand its skill base and give them a solid foundation of expertise on which to build. Personnel with doctoral degrees in these areas have instant credibility when dealing with civilians at other agencies when it comes to discussing professional theories and concepts. Using reservists would establish closer relations with organizations such as Defense Intelligence Agency (DIA) civilians who are academically on par with many of these individuals to effectively relate to them (Ref 6).

PSYOP, MILDEC, and CA cover the second largest contribution that the NR FIWC detachments could make. Cultural understanding is critical in order to find out what will influence various peoples/nations and ethnic groups including the importance

of religious holidays and social values. The NR FIWC detachments would provide this talent and expertise for consultation and discussion on ramifications of actions planned or considered. For instance, Ramadan in Muslim countries is an important event and must be understood and respected to prevent any slight to the country that is being influenced including allies.

NR FIWC detachments can also man the Transportable AM/FM Radio Broadcast System (TARBS) and provide personnel to train with it during exercises similar to how the Army operates their PSYOP organization. This would aid in dealing with the issue on how to employ the TARBS by having one of the NR FIWC detachments own and maintain it. The system would have a support structure that would provide ownership and skilled operators. Procedures and tactics derived for using the system would be exercised by a core group of individuals who, combined with their civilian backgrounds, could maintain a high level of proficiency.

4. Cost Effectiveness

The low cost implication of these detachments will be driven by the fact that the computer systems for the remote detachments will only be required to be purchased because the detachments can install it themselves. There would be no contractor costs other than the DSL line being connected. As information systems experts, they could be given a fiscal budget to purchase and upgrade their own equipment thus saving the government tens of thousands of dollars in contractor fees. The systems to be used must be fully integrated into FIWC, NIWA and JIOC so as to readily provide support to these organizations. T1 lines, Video Teleconferencing systems, and SIPRNET access will

allow the unit to be anywhere virtually at anytime. This will alleviate the problem of not being collocated and to provide support to the JRVIO.

Activation of these units to support FIWC and the fleet will not necessarily require them to travel anywhere but to their own reserve center due to the virtual world in which they work. This is a cost savings to the government and will have them online and working while their activation processing is on going. Waiting three to four days to get the unit activated to provide support may be a critical. This was critical in the Gulf War when the 193rd Special Operation Group Pennsylvania National Guard was able to deploy an already activated unit to the Gulf while still mobilizing the rest of the unit (Ref 25, p. 3-5).

What makes the reserves an excellent place to grow the Information Operations expertise is that they do not have to transfer every two to three years because many promote into the next higher grade billet in the same organization. They can remain in these organizations for extended periods and can even spend the majority of their careers in this field without it becoming a detriment to their promotion opportunities. This is not true of the active forces where an officer has to maintain a sea/shore rotation and return to serve in their primary community specialty. The expertise will stay in the reserves and the personnel in the unit will become highly skilled. They can stay in the units and train the new personnel as the slow rotation of personnel occurs.

Another great advantage of reservists is personnel cost. It is estimated that the cost to maintain one person on active duty is equivalent to about 7.6 reservists (Ref 20). Mobilization costs are incurred prior to deployment and during OPERATION DESERT STORM the total cost for mobilizing reservists was only a mere $260,416 out of a total

$16,100,000 spent on PSYOP during the war (Ref 25, p. 3-3). That is a tremendous asset for the 110 reservists activated encompassing the Pennsylvania National Guard and multiple Army units where specific skills were sought out and utilized to support the effort (Ref 25, p. 3-9).

5. Billet Structure

These units can be established in a similar manner to the San Diego active detachment with the exception that it will have less personnel and less hardware. Detachments should have a Selected Reserve (SELRES) Commander (O-5) as the Officer-in-Charge and a supporting staff can consist of Information Systems Managers, Computer Scientists, Computer Network Security Specialists, and Programmers who can perform a variety of functions for the Navy. The detachments should also consist of personnel with doctoral degrees in psychology, sociology, history, and political scientists along with personnel with marketing and sales experience, broadcasting and communications, linguists, and technicians.

The officer billets should be labeled primarily as 1000 coded billets so that any qualified officer could fill the billets and not specified by community. The only requirement would be to have the correct subspecialty code that will identify them as IO personnel. The Navy is also proposing a new Information Professional community that would incorporate reservists and further aid in identifying individuals for CNO. A Naval Reserve Force system could also be developed similar to the active subspecialty code system to aid in this mission. The billets would be described as Computer Network Operations, PSYOP, Deception, and Civil Affairs with job descriptions on their Individual Training Plans indicating that the person should have a doctoral degree in a

specific discipline, a Master's of Science in Computer Science or Information Technology, or other related IO fields. This is due to the fact that extensive training will not be available to personnel because of restrictions in active duty and weekend drill time. These individuals must have the prerequisite backgrounds to support IO from the start.

Enlisted personnel should be labeled primarily as Chief Petty Officer (CPO), Petty Officer First Class (PO1) etc... vice rating specific so that Enlisted Naval Reservists with computer skills will not be restricted. For instance, Machinist Mates with Masters Degrees in Information Systems should not be prevented from filling a billet as a CNO operator. The proposal for creating Information Technology Network (ITN) rating would also assist in identifying skilled personnel. These changes should be identified and entered into the manning document. The USAR IO organization is presently disregarding Military Occupation Specialty (MOS) codes and relying on civilian occupations and educations to identify qualified personnel (Ref 35 p. 15). Enlisted Readiness Training Plans should be tailored like the officer plans with the exception that it be focused on the technician side. However, if the individual has a higher degree such as a Master's Degree in Computer Science or Information Technology it will satisfy the Information Technology Technician requirement.

FIWC is the operational commander and must supervise all training evolutions, operations, and support to the fleet. This also includes management of personnel through updating requirements in training plans and monitoring their manning to ensure that the right personnel are there to support them when needed. FIWC can defer the west coast detachments' management to the San Diego detachment for efficiency purposes but the

Reserve Liaison Officer (RLO) must coordinate all operations overall and specific requests from the fleet during the week for weekend work.

The utilization and modification of NR FIWC detachments can best utilize the expertise in the reserves to support the active forces in Information Operations. The advanced technologies in use today require personnel such as Naval Reservists who attain and maintain proficiency day-to-day providing a technical base that is difficult to attain for frontline forces. The demand in the civilian world for IT personnel is growing and more and more sailors are leaving for the private sector. Using reservists to support IT/IO is critical as this trend continues. Creativity and innovation are highly needed talents in the IO arena and should be sought out. The utilization of the NR FIWC detachments is an inexpensive and effective way to take advantage of the reserve talent.

VI. CONCLUSION AND RECOMMENDATION

A. SUMMARY

Throughout history, Information Warfare and Information Operations have been critical factors in peacetime and surging for conflict as cited throughout Sun Tsu's *The Art of War* (Ref 29). The methods of receiving and disseminating information have advanced with technology, allowing more information to move faster than ever before. The talent and skill requirements to effectively manage technological changes in the IT world and the demand for cultural, psychological and linguistic abilities can be provided by the Naval Reserve.

In investigating history for requisite skills, it was noted that those conducting IO were primarily civilians in uniform with talents developed in the civilian sector. Barristers, businessmen, financiers, bankers, actors, and many other occupants made up the London Controlling Section and Dudley Clarke's 'A' Force. Outthinking their opponents was their primary objective; many even thought of it as a strategic game and were attracted to the excitement of deception. In reference to OPERATION MINCEMEAT, Ewen Montagu stated:

> My first excursion into crime gave me an understanding of how fascinating a criminal's life can be, and why some men and women prefer it to any other and, in spite of what some theoreticians may contend, do not want to be reformed (Ref 9, p. 150).

The same vision and purpose of these individuals can now be found in Naval Reserve personnel, who could be best utilized in IO.

Computer networks are merely an information medium and not information in itself. Information comes from people and is the heart and soul of IO, not the computer

chip, the disk drive, the T1 line or the router. The skills required to effectively conduct IO have traits possessed in many civilian professions, which in turn can be utilized through the Naval Reserve to support IO.

Expanding the use of reservists in IO will enhance the overall capabilities of the Navy. Many skills needed for IO are difficult to develop with the present rigid sea/shore rotation program for Naval Officers who are primarily trained to go to sea and fight ships, planes and submarines, not conduct virtual Cyberwar or deception operations. There is little time in the normal span of a military career to develop IO skills, and creating another separate specific community will not give the military the continuity it needs due to the draw of the civilian world's higher salaries.

Personnel on active duty have difficulty in maintaining IT proficiency once they leave the computer field for their normal sea rotation.. Having a surface line officer go to sea for four years, then return to run an IT office or computer network operation with new technologies that he or she is not familiar with is not a benefit to the Navy. These individuals will spend more time trying to learn the needed skills and will have to transfer back to sea again by the time they become proficient. A solution is to use reservists who have been working in the field and can provide their civilian trained expertise for many of these positions.

Naval Reservists with cultural experience, doctoral degrees in the social sciences, linguists and business professionals are invaluable. The IO officers need to have the core expertise in cultural, political, and psychological implications at their fingertips. Blending the Naval Reserve component with regular naval officers will provide the "out

of the box" thinking combined with Fleet experience needed to maximize the effectiveness of the existing IO force.

B. RECOMMENDATION

Expanding of the use of the NR FIWC organization consolidates the IO talent in one chain of command to be readily managed and available for utilization. Multiple detachments can be established throughout the country to harness civilian professionals in such areas as San Jose and Atlanta where concentrations of IT expertise, businessmen and university professors exist. FIWC can support agencies and the Fleet with technical assistance utilizing the reserves vice having to go to contractors and pay for systems, equipment or work that can be provided by its own reserve augmentation force. If the CINC IO officer needs someone with experience in a specific computer system that a target is suspected of having or they need some advice on influence in a certain region of the world, they can call on the JIOC who can tap FIWC's reserve support. They will have a broad background in computer expertise in various systems and an intellectual base to support PSYOP/Deception issues. The benefits are reaped when they can provide technical solutions for the IO Officer with an understanding of the implications involving IO. This may not be readily available from a contractor or from another government agency.

NR FIWC detachments can also be used to provide technical assistance to commands and military educational institutions such as Naval Postgraduate School and the Naval War College. Large commands with vast computer networks may need to utilize NR FIWC detachments to provide computer network expertise for assessments on

system security. These detachments could conduct assessments for commands and make impartial determinations.

NR FIWC detachments can also provide expertise in area studies with Naval Reservists who hold doctoral degrees. Personnel with advanced degrees in area studies can be useful in providing expertise in regions of the world where crises arise. Knowing that an expert on the Sudan, for example, is located in an NR FIWC detachment provides a reach back capability to IO Officers. This individual may be one of the leading experts on the area and presently teaching at a leading institution. This is someone with instant credibility and who could provide the expertise greatly needed to the CINC.

Effective utilization of NR FIWC detachments will enhance the IO expertise by providing low cost and effective personnel that are not readily found on active duty or in mission areas not usually supported by the Navy such as CA. By simply utilizing the available talents in the form of NR FIWC detachments, a force multiplier will be brought into effect.

The Navy may have valid reasons to reject this proposed use of the Naval Reserve in support of the IO mission areas through FIWC. There are some difficulties involved in using reservists in all situations because of time constraints and conflicts that clash with their civilian professions. These full time professions, however, are the reason they are invaluable in supporting IO mission areas. This research does not advocate using reservists as the main force but only as augmentation. This will encourage interaction between the Naval Reserve Force and the IO organizations to actually gain usage of these assets, even if in a limited framework.

Utilization of IO talent in the Naval Reserve Force will ultimately benefit the Fleet and the Naval Reserve Force. By simply utilizing this available talent through FIWC, a tremendous force multiplier is brought into effect for use in peacetime and surge to conflict situations. In case of conflict, these reservists can provide their traditional role as support forces by being quickly activated and ready to provide service to the Fleet. The advantage is that the infrastructure will be there to quickly fill the expansion of the military with qualified and experienced personnel in this critical mission area. Timing and speed is important and each day is crucial in preparing for and conducting IO. The expansive talents provided by the diverse makeup of Naval Reservists provide the critical impetus essential for future IO engagements, and must be developed and utilized now.

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