Executive Summary

In April 2005, General M. W. Hagee, then Commandant of the Marine Corps, released the white paper entitled *A Concept for Distributed Operations*, which was "intended to promote discussion and to generate ideas for specific combat development initiatives" in the context of "the irregular challenges of Small Wars," enabling small units to function with greater operational initiative and independence. In response, the Marine Corps Combat Development Command (MCCDC) initiated a number of activities, including Limited Objective Experiments conducted by the Marine Corps Warfighting Laboratory (MCWL), to explore the concept of distributed operations (DO). In late 2005, Lieutenant General James N. Mattis, CG MCCDC, requested that the Naval Research Advisory Committee (NRAC) devote one of its annual Summer Studies to DO, comparing and contrasting the emerging concept with conventional operations, determining how selected technology insertions could enable DO, estimating risks associated with various options, and identifying potential show-stoppers. Lieutenant General Mattis' vision was that distributed operations would "unleash the combat power of the young Marine" and his guidance was for NRAC to focus on the "squad level as a system." At the direction of Assistant Secretary of the Navy (RDA) Dr. Delores Etter, NRAC undertook the study during the period February–June 2006. At the time of the study was completed, Lieutenant General Mattis had been reassigned to command the I Marine Expeditionary Force; the study was briefed to his relief as CG MCCDC and Deputy Commandant for Combat Development and Integration, Lieutenant General James F. Amos, who consulted the Panel on implementation through early 2007.

The NRAC Panel was privileged to engage in early discussions on DO's emerging concept of operations where doctrine was still evolving and military experiments were just beginning. Fact-finding by the Panel thus focused on understanding the operational concept, which was the subject of ongoing discussions among uniformed and civilian Marine personnel. NRAC tested its understanding through repeated interactions with MCCDC and MCWL, who largely concurred with the Panel's interpretation and articulation of the approach represented by DO.

In this context, the Panel found that implementation of DO would demand significant effort, including technology development, in three primary areas: communications, logistics, and education and training.

Available, reliable, and secure communications are central to the DO concept, given increased spatial dispersal of small units and the attendant requirement that they have access to remote fires and intelligence, surveillance, and reconnaissance (ISR) resources. To achieve the spatial separations specified by MCWL analysis, very significant augmentation of currently organic communications systems at the platoon and squad levels will be required, adding to both the difficulty of logistical support and training of DO units. Furthermore, the added complexity of the battle space network is a clear risk to DO success, given that many small units will be operating simultaneously in this manner.

Critical to successful execution of DO will be the timely and reliable resupply of spatially dispersed small units through a variety of air and ground assets. In addition,

confidence of the squad in timely and accurate resupply will be essential for Marines not to increase further the already excessive individual load carriage requirements typical of Marines in conventional operations. The development of several types of unmanned systems appears to be the most feasible approach to address this challenge.

In addition, Marines conducting DO will need extensive training in communications and logistics support systems, independent tactical decision-making consistent with commander's intent, and cultural and linguistic training enabling the small units to interact with local populations effectively. This additional training, much of which will require the unit as a whole to train together, has significant implications for manpower management and force structure. The Panel found that modern immersive training (borrowing heavily from entertainment industry technology) has an important role to play in supporting these training requirements and potentially in screening of personnel most likely to benefit from the additional training investment. In general, the requirements for DO elevate the infantry Military Operational Specialty (MOS) to be comparable to other highly skilled MOSs.

The Panel's principal recommendation is that the Department of the Navy establish a "DO Marine as a System" Science & Technology (S&T) Program, resourced at approximately $50M/year for the level of challenge represented by DO as a transformational concept of operations. This will require careful prioritization of Marine S&T investments, significant additional resources from the Office of Naval Research (ONR) beyond the current program of record within ONR Code 30 and MCWL, as well as effective leverage of investments by the Defense Advanced Research Projects Agency (DARPA), the Army, and Special Operations Command (as well as DoD investments in Joint infrastructure, such as the Global Information Grid [GIG]).

Additional top-level recommendations include the following:

1. MCCDC should ensure that communications and networking requirements of DO will be supported in planned DoD battle space architecture.
2. The Marine Corps should evaluate the feasibility, desirability, and means of aging the force in order to maximize return on investment in much more highly trained infantrymen.
3. The Marine Corps should retain or establish an "honest broker" (independent of vendors and integrators) to conduct DO communications system engineering.
4. The Marine Corps System Command should elevate the Marine Expeditionary Rifle Squad (MERS) "Program" within the acquisition structure so that programs that provide equipment to MERS are subordinate to it, so that the system engineering required for the squad Table of Equipment can be effective.