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Synthetic biology and undersea medicine are fascinating fields of research, with the program manager at the office of Naval Research of both fields, Dr. Sandra Chapman, discussing the various projects and focuses of her department. Behind her discussion lies the vital aspects of warfighter capability, namely the six senses, and the enhancement of their clarity and power relative to the soldier's speed of response. Individual overmatch capability, the relative of capability of a soldier to overwhelm his opponent on the battlefield, is the chief area of focus for Dr. Chapman in the project she oversees. The augmented reality heads up display currently under development is a distinct addition to the diver's overmatch capability, however, the goal of 'Aquaman' presents not an addition, but an inherent, powerful quality of overmatch. The weight of the average military diver's gear is an excessive loss of maneuverability and thus of sight and reaction speed to the 'sixth sense'. The synthetic biological solution of a catalyst-containing mask to split water molecules with electrolysis to provide the swimmer with oxygen is self-contained and lends itself to much greater clarity of senses and thus a huge overmatch advantage. Undersea medicine improvements achieved with synthetic biology achieve the highest possible level of overmatch capability for that improvement compared to external, mechanical solutions. Dr. Sandra Chapman as program officer of the areas of synthetic biology and undersea medicine prioritizes these types of solutions because of their permanence and extreme advantage to soldier's overmatch capability.

Dr. Sandra Chapman has a fascinating career before and ahead of her, with many similarities in purpose and preference to my chosen career. With an interest in biomedical science in undergraduate school and a PhD in molecular medicine, serving in the AAS Science and Technology Policy Fellowship program which gave her broader perspectives, and a final transition to the Office of Naval Research to direct the programs of undersea medicine and synthetic biology with naval applications, her path models the path of one interested in integral, synthetically biological changes to prevent harm and increase capability. I plan to obtain a MD/PhD to serve and research in life support for the spacecraft and colonization technologies being developed. I've always loved the sciences of biology and chemistry, and plan to pursue a biomedical engineering undergraduate degree before obtaining my MD/PhD. The programs of synthetic biology and undersea medicine are incredibly interesting since synthetically made material's interaction with the body is of primary study in interplanetary space transportation technology. The biomedical research I will conduct throughout undergraduate and graduate school will be much more effective if I factor in the permanence of biologically synthetic changes instead of mechanical, and the effects of undersea operations on the body and its life support. A thorough exploration of synthetic material and body interaction is a required study in the science of extraplanetary colonization and interplanetary travel, and this introduction to Dr. Chapman's work will greatly help me later as I delve deeper into the impact of interplanetary travel and extraterrestrial habitation on human physiology.

A revolution in undersea warfighter overmatch capability could transform the next two decades in terms of naval warfare and marine intervention. It would completely morph the average navy diver, weighed down with scuba gear and combat equipment into an efficient, safely self-contained warfighter. This future 'Aquaman' has the bacteria making up sixty percent of his body's mass increasing or decreasing his body's temperature to suit the surrounding water's temperature, the skin-tight mask using electrolysis to separate the water molecules into an unlimited flow of oxygen in any body of water, and the augmented reality wrap around heads up display all discussed by Dr. Sandra Chapman. He is a diver with no need for oxygen tanks, a sight-reducing scuba mask, or a restrictive, one-factor safe bodysuit. The biological improvements could continue with prosthetic flippers connected to the mind, added to

the feet and hands, with genetically altered eyes for improved sight underwater, and more. These breakthroughs would of course benefit recreational swimmers in both safety and purpose but would provide unimaginable possibilities to the Navy and Marine Corp, with the electrolysis mask technology possible being used on submarines, and underwater vehicles specifically networked with warfighter's heads up displays. Revolutions in science and technology are not a result of time, but of purposeful creativity and intensity of effort, both qualities, displayed by Dr. Sandra Chapman in her work, that will result in fantastic opportunities for the Navy and Marine Corp.