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GRAY SPACE
AND THE WARFIGHTER

A Research Project

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Preface

This is a hypertext markup language (HTML) research project on the impact of “*Gray Space*” satellite systems on the US military. We define *Gray Space* as those satellite systems available to the general populace that could potentially be used against the US and its allies for hostile purposes. The project is intended to be used as either a teaching tool for military educators on space systems and capabilities, or as part of an Internet site discussing emerging military space issues.

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Abstract

The emerging commercial satellite industry is posing unique problems to the US warplanner. *Gray Space* is defined as those satellite systems available to the general populace that could potentially be used against the US and its allies for hostile purposes. This hypertext markup language (HTML) research project explores this issue.

The project is divided into four sections: (1) US Space Capabilities, Roles and Systems (2) Use of Space in Desert Storm (3) *Gray Space* Satellite Systems (4) Theater Planning. Section one begins by pointing out there is no official US space doctrine published. However, the generally accepted four space roles of Space Control, Force Enhancement, Space Support and Force Application are discussed. Air Force Doctrine Document 4 (Draft) on space doctrine is then used to enumerate various roles space brings to the fight, such as surveillance, early warning, secure communications and meteorological information. Finally, the various US military space systems and their capabilities are presented along with a brief discussion of the civilian systems the military uses (the military's use of *Gray Space*).

The second section looks at the use of space systems during the Gulf War, dubbed the "first space war" by Gen Merrill McPeak. The issues of what needs to be done to better integrate space into all facets of air operations is discussed. In addition, it highlights how planners must understand how space can help them better observe the battlefield and make more timely operational planning decisions. Space must integrate its activities into all

exercises and training so every airmen can use space. Warfighters must demand user equipment for their aircraft and weapons which will increase the lethality, versatility and precision of all aerospace systems. Space must be made more accessible to planners and warfighters. The “space bureaucracy” is far too complex and should be streamlined and made user friendly. The space community and the warfighter need to work as one toward becoming the “air and space force.”

The third section of the HTML provides background on numerous *Gray Space* systems, including images and text describing missions, satellite summaries, and basic descriptions of goods and services. Most of the information contained in this section came from the Internet; the remainder came from open source books and magazines. *Gray Space* satellite systems are broken into four main categories: Surveillance Satellites—providing multispectral remote sensing from space for earth resources management applications, and potentially for intelligence collection purposes, Communication Satellites—providing reliable global communications via radio, video, fax, or pager, Meteorological Satellites—providing up-to-date weather information, and Navigation Satellites—providing accurate positioning data for worldwide users.

The fourth section highlights the challenges *Gray Space* assets have on theater war planners. Space has improved the way the US military fights its wars—without their space eyes and ears they could be fighting in the blind once again. The tough question is how to achieve and maintain the control of space while denying an enemy the same. To understand the impact of *Gray Space* assets, a warfighter must work with USSPACECOM to obtain a list of all satellites, military and civilian, within his theater of operations. Therefore, the research project identifies satellites that may be used by

selected nations to augment their military force structure. The countries selected represent nations where the United States has intervened militarily in the past or where a future conflict may take place. The warfighter must do an assessment of what satellite services are available to both friend or enemy. At that point a risk assessment must be done to help decision-makers decide what instruments of power must be used to counter the space threat. In addition, they must identify *Gray Space* assets they want to augment their force structure, such as the leasing of INTELSAT satellite bandwidth to increase communication capacity.

In the conclusion the concept of *Gray Space* is summarized. *Gray Space* is the predominant threat to continued United States control of space. A brief description of the goods and services available is presented, with examples of how an enemy could use surveillance, communications, meteorological, and navigation data to inflict damage upon the United States or her allies. The conclusion ends with a discussion of how the warfighter could potentially combat the *Gray Space* threat, although no real easy answers exist. But to hope to defeat an enemy, one must first understand it—this document helps the warfighter address this critical first step.

Chapter 1

Background

The main reason for electing to do research on *Gray Space* was the enormous challenge of trying to achieve the United States Air Force's newest core competency of space superiority. With the dramatic shift from predominantly military satellites in space to commercial space-based assets, the research team wanted to determine the impact civilian satellite systems could have on the warfighter. This impact was highlighted during Desert Storm when the United States was concerned about Iraq securing SPOT satellite images of the battlefield. The incident with SPOT inspired the two space operators on the team to investigate the possibility of doing a multimedia product to educate future Air Command & Staff College students on the impact of *Gray Space* satellite systems.

Initially, we looked at doing a ToolBook™ product but it was recommended we do a HTML, web-style page. To balance the team's roster, two individuals with non-space backgrounds were included to add the required computer expertise and to ensure the product remained coherent and did not drift off into space "techno-babble." Every member contributed to the document as a whole; all were surprised to learn just how easy it is to get access to satellite services and products with the right amount of financing. The majority of information used in creating this HTML came from Internet sources. Satellite imagery, as well as communication transponder availability, was widely advertised

in many corporate homepages. Additionally, military systems have been given government authorization to sell satellite products and services commercially as well. We live in a global market and nowhere is it better illustrated than in the space industry.

Chapter 2

Project Format

In using the HTML format for the project, the goal was to use the multimedia aspects of HTML to enhance the learning of the subject. At the same time we wanted to avoid multimedia purely for multimedia's sake. It was important that it was the means and not the ends. We also desired that it be user friendly and straightforward. Too many *Toolbook™* projects we have seen have some many branches and things to "click" on that they tend to be confusing and lose the reader.

The project was split into the five sections discussed above and are linked through the *Gray Space* "home page." We avoided linking between the sections to preclude getting "lost" within the document and to encourage the reader to proceed through the document sequentially as it was intended to be read. We used some of the unique capabilities of HTML linking to effect the following. Throughout the document, references to end notes link to the particular reference at the end of the page, and then returns the reader to where he left off. An example of satellite imagery resolution is demonstrated by linking to a frame page that sequentially leads the reader through progressively finer resolutions. The Theater Planning section has a link to a Unified Command AOR map which provides example countries and their accessible *Gray Space* assets by clicking on a particular AOR then a country. This also utilized frames. Finally, throughout, color images of the various

satellites and example services were used to enhance the learning impact of *Gray Space* on the warfighter.

Chapter 3

Future Research

With the field of commercial satellites is changing so rapidly, this project will need to be updated on a recurring basis. Thus there are several areas for continual updating and additional research. The section on US space doctrine will need to be updated as soon as Joint Pub 3-14, “Joint Doctrine, Tactics, Techniques, and Procedures for Space Operations,” is published, as well as when US military space assets change. Section two on Desert Storm is probably on the most solid ground unless pertinent classified information is subsequently declassified. The third section on actual *Gray Space* systems is neither exhaustive, nor current once it is printed, and will require continual updating. Finally, the section on Theater Planning will need to be updated with changes, as well.

This project’s intent was to present an issues and information; posing questions in the conclusion rather than answering them. Answering these questions of how to deal with the *Gray Space* threat has the greatest potential for extensive research and exploration. The emerging areas of Information Warfare and Command and Control Warfare are likely candidates, as well as exploration of the issues of anti-satellite and space based weapon systems.

Chapter 4

Conclusion

With satellite consortiums growing to over one hundred member nations, the challenge of ensuring space superiority in a high threat environment is a difficult one. The warfighter must address the tough political issues of denying an enemy the free use of space but not at the expense of hurting friendly nations. All instruments of power must be evaluated to ensure the best possible course of action is selected to deal with the threat of *Gray Space*.

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