

# MASTER OF SCIENCE IN SYSTEMS ENGINEERING

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## THEORETICAL AND EXPERIMENTAL STUDY OF MICRO AIR VEHICLE POWERED BY RF SIGNAL AT 10 GHZ

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Micro air vehicles (MAV) belong to a new category of uninhabited air vehicles (UAV), and are several orders of magnitude smaller than the ordinary UAVs. A method of providing power to a MAV using microwaves presents several advantages compared to other types of propulsion, such as minimization or elimination of the power source onboard.

Two prototype MAVs were constructed and tested for power consumption calculations. A rectified array antenna (rectenna) was built, using identical rectifying elements consisting of a patch antenna, Schottky barrier diode, and input and output low pass filters. Several experiments were conducted and the results showed the feasibility of the concept of powering micro air vehicles using rf energy in the form of microwaves.

**KEYWORDS:** Micro Air Vehicles, Rectifier Antenna, Rectenna, Microwave Power, Schottky Barrier Diode

## INFORMATION WARFARE TARGETING: PEOPLE AND PROCESSES

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Information Warfare (IW) targeting has long been a crucial, but unrecognized, part of military operations. From Sun Tzu's targeting of the enemy's will to fight, to today's information-centric warfare, it is those who have understood the techniques and applications of Information Warfare targeting who have most often prevailed. As critical as it is to success, it is a topic that is controversial, often misunderstood, and subject to various interpretations.

This thesis examines the IW targeting process, consisting of people, information, systems, and the interaction between the function of targeting and IW. In the Information Age, IW has been recognized as viable warfare area. However, IW targeting cannot be treated as traditional targeting utilized by other warfare areas. This thesis is intended to serve as a guide for the study of this topic and provides an instructional program designed to satisfy the requirement for a coherent instructional program on IW targeting.

IW targeting affects every facet of warfare and in turn is affected by these facets. In preparing for a future that calls for maximizing the effects while minimizing the effort, it is critical that the process be understood in order to remain effective.

**KEYWORDS:** Command and Control Warfare, Effects Based Targeting, Information Warfare, Information Operations, Targeting