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Extended Abstract

1. Introduction
International boundaries are considered as the first point of impact and the frontline of combat with threat; hence, boundary security greatly induces the national security of the country. As a result, throughout the history, governments have always tried to apply various plans and policies, proportional to the time, place, and technology in each historical period to secure the boundaries. The construction of the Wall of China, Hardin, Golestan, etc. by the governments is the evidence of this point. Iran, due to being located in the Middle East, is faced with major challenges and developments. The threats such as illegal migrations, human and drug trafficking, the importation of prohibited goods, and ethnic movements on the one hand, and the specific features of the border areas – geographical isolation, being away from the center, the lack of development of the border areas, etc. – on the other hand, spread insecurity in the border areas. Therefore, it is essential to study the optimal approaches and strategies of boundary management.

2. Theoretical Framework
The concept of boundary security refers to the prevention of any act incompatible with the national boundaries law of one country and the legalization of people and goods’ transport as well as the domestic animals allowed through the boundary gates in compliance with the legal norms (Zarghani, 2007). Obviously, boundary security with its diverse aspects strongly supports the security inside the country (Khatabi, 1995). In the case of security, boundary management, and boundary control, there are several policies and strategies. Countries, according to geographical, political, economic, geopolitical, social, and cultural features, use these designs and practices. In general, three types of management models exist in

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the field of boundary management and control: Military-disciplinary management model, functional developmental management model, and integrated and combined management model. In Military-disciplinary management model, boundary control and management is done by the military and police forces because of the threats in the surrounding countries and across boundaries. In this model, control and boundary management is done by using traditional and modern methods and tools including physical obstruction (digging channels, blocking the opening of the boundary, installing barbed wire, creating fine soil, concrete wall, etc.), hardware obstruction (the strengthening of boundary forces, formed military units, the boundary security of border area, etc.), and software control (the use of geographic information systems, space sensors, radar surveillance and eavesdropping, electronics and optics equipment).

3. Methodology
This study is descriptive-analytical and for collecting the data, documents from library and the Internet were used. Moreover, MATLAB software was used for simulation. This software has a wide range of applications, such as signal and image processing, communications, design, test and measurement, modeling, analysis, simulation and so on. This study examines the various methods of control and boundary management in various ways; and finally confirms the use of wireless sensor network as a modern way in science and technology to provide good control of boundaries and its effectiveness in security and boundary control in the border areas.

4. Results
The threats surrounding Iran during the past three decades has led the country to use different policies, plans, methods and tools to manage territorial boundaries. A review and estimate of the efforts in recent years in the field of management and boundary control including constructing earthworks, building materials, establishing boundary checkpoints, using barbed wire, etc. showed that despite spending a lot of money, they cannot effectively manage and control the boundaries. The findings of this study demonstrated that the use of wireless sensor network model in terms of simulations model utilizing three factors, i.e., vibration, speed, and amount of metal, well represented the detection of the moving objects in any type of physical environment. Therefore, based on simulations performed, this type of sensor can be used in any geographical environment, including water, marine, land, swamp, forest, and so onto control and manage the country's boundaries.

5. Conclusion and Suggestions
The unsecured strategic environment dominant in Southwest Asia, the governments and the poor governance in some neighboring countries of Iran, a continued political instability, economic crises and multiple tensions, forced migration, refugees, etc. in one hand, and Iran's long dry and water borders with its neighbors on the other hand, confirms that Islamic Republic of Iran has no choice except the
strengthening and the management and control of the boundaries for national security. To manage and optimize boundary control, various methods and tools have been used that some of them, such as building walls, digging ditches, etc., have not only had a high cost, but also did not work. Accordingly, the use and application of new tools and technologies for monitoring and controlling the boundaries of the country is essential. Wireless sensor networks are one of the newest technologies that we are able to use constantly, especially in certain situations (for example, in very rugged mountainous areas) and to monitor and supervise a specified location. In fact, by the design of electronic control boundaries and using wireless sensor networks, boundary management can be done at a relatively lower cost. Wireless sensor networks can be used as an important part of communications, surveillance, navigation and systematic process of military and can be used in any geographical environment, including water, marine, land, swamp, woodland in order for the control and management of boundaries.

**Key words:** Boundary, Boundary control, Boundary management, Wireless sensor networks

**References (In Persian)**


References (in English)


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