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**Министерство науки и высшего образования Российской Федерации
федеральное государственное автономное образовательное учреждение
высшего образования
«Российский государственный университет нефти и газа
(национальный исследовательский университет)
имени И.М. Губкина»**

ТЕЗИСЫ ДОКЛАДОВ

**74-Я МЕЖДУНАРОДНАЯ МОЛОДЕЖНАЯ НАУЧНАЯ
КОНФЕРЕНЦИЯ**

«Нефть и газ - 2020»

28 сентября-02 октября 2020 г.

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**Секция 11. «Представление научных статей на
английском языке»**

Cyber Vulnerability Matrix of the Internet of Things Technology in Upstream Operations

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ABSTRACT

The paper discusses the problem of cyber security of the Internet of Things technology in upstream operations. Using such methods of analysis as case studies, quantitative and qualitative research, data collection and representation, it is concluded that the most prone to cyber-attacks are production and development drilling processes. Based on the comprehensive analysis the cyber vulnerability matrix of upstream operations is developed.

KEYWORDS

Cyber vulnerability matrix, the Internet of Things (IoT), cyber security, upstream operations.

As far as the upstream sector is concerned, petroleum companies need to use the Internet of Things (IoT) technology to increase the production level. Along with many benefits, this innovative technology has some disadvantages, the most important of which is the possibility of cyber-attacks on oil and gas companies which results in the cyber vulnerability of the IoT.

The problem brought up seems to be relevant and scientifically novel due to the fact that nowadays severe and expensive cyber attacks on the IoT in upstream operations have become commonplace. The main purpose of the research is to identify upstream operations most risk-prone to cyber-attacks. As a result, the cyber vulnerability matrix of the IoT technology in upstream operations has been developed.

To conduct the research the following methods of analysis were used: case studies, quantitative and qualitative research, data collection and representation.

In the research the focus is put on the analysis of exploration, development and production operations cyber vulnerability. With the use of various studies in this area, including oil and gas cyber security reviews of recent cyber-attacks on products and services, it was stated that production and development drilling processes are the most prone to cyber attacks, while geophysical surveys and seismic imaging have the lowest cyber vulnerability [1, 3].

As it is clear from Figure 1, the development drilling operation has a significant cyber attack vector, due to the high drilling activity, expansive infrastructure and services both above and below the surface. In its turn, oil and gas production operations are characterised by the highest cyber vulnerability, mainly because of its outdated asset base and lack of monitoring tools on existing networks [2, 4, 5].

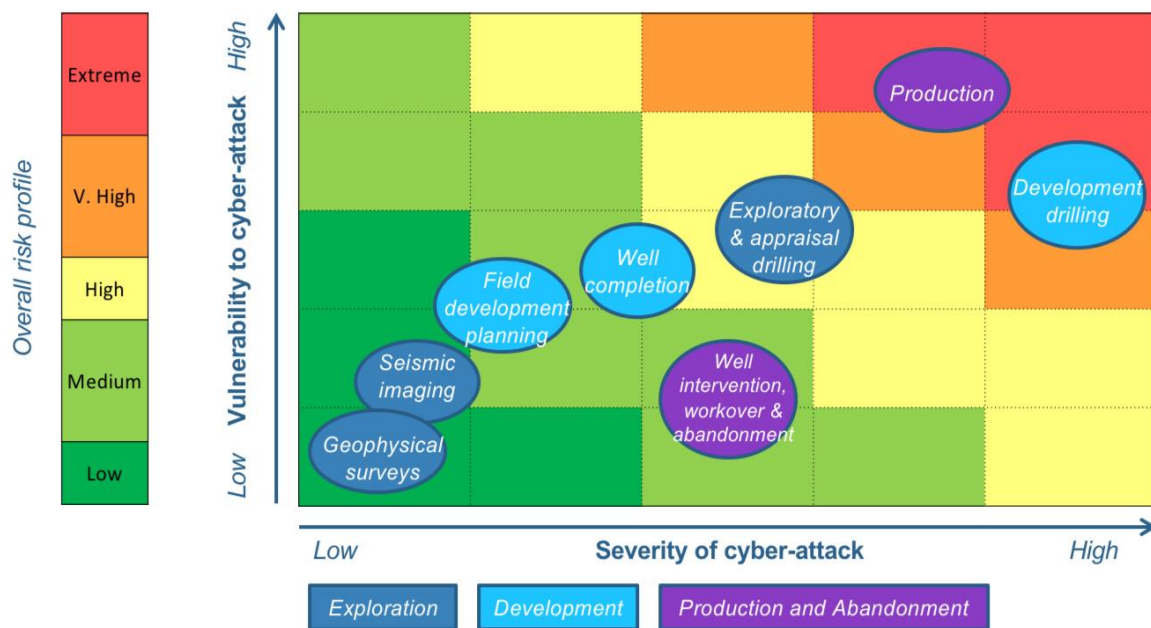


Figure 1 - The cyber vulnerability matrix of the IoT technology in upstream operations

The results of the research indicated that investing in production and development drilling operations cyber security primarily will be more economically feasible, because hacker attacks in these operations are considered to be the most severe. The results obtained might be used to expand the knowledge in the sphere of cyber security and to prevent cyber-attacks on upstream operations.

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