Wireless Technologies for Integrated e-Operations in Offshore Environments

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ABSTRACT: In large and complex production environments it is impossible to install a full-featured physically wired network to manage operations, 24/7, because of nature and the complexity of activities and data. Wireless networking can bring major benefits in such settings, and in particular where e-Operations and smart technical solutions remains the ambition. Wireless sensor network (WSN) have the capability of real-time monitoring and automatic control of in-building environment is a vital application. Some of the challenges, for instance, the poor link quality in the transitional region may be attributed to the many obstacles within the path including concrete element, brick walls, plasterboard partitions, office furniture and other items that either absorbs or reflects these waves leading to signal loss or multi-path effects. Therefore, combination of technologies, for instance, wireless local area network (WLAN), radio frequency identification (RFID), Bluetooth, ZigBee and remote sensors would be the best solution in congested sites. Sensors can be connected to a WLAN, which then collect data and transmit it to a central location. Experts in production environments can monitor their equipment, production and process condition from a control room or an office. This paper presents a framework for potential application of such a combined solution for offshore oil & gas production environments.

Index Terms – Assets management, Integrated operations, offshore oil & gas production, wireless communication,

1 INTRODUCTION

Many industrial sectors across the world undergo major changes today as the conditions under which commercial operations have to be performed have taken significant turns. Various factors ranging from economic recessions to new regulations have brought many challenges where high-risk sectors in particular are compelled to find novel and innovative solutions to manage their commercial operations. Offshore oil & gas production industry has over the last few years begun to launch many advanced solutions committing USD billions of investments so that complex production facilities can continue to be operated for a prolonged period of time. Across the world, while there is a constant growth in the demand for energy on one hand, the available production capacity has large limitations on the other. In North Sea, in particular the challenges to the offshore oil & gas production process became very evident in the early 2000s. It became very clear that a considerable proportion of the existing production facilities have reached the maturity in production with a forecast that production can only be limited to 2-3 decades ending the prospects. Moreover, new findings were quite marginal restricting further investments for field development as the cost levels were calculated to be quite high limiting economical feasibility of new projects. The entire sector clearly identified the need for innovative solutions, so that production costs can significantly be reduced, and at the same time safety and other risks can be effectively met, while prolonging the commercial lives of major assets. Obviously, the