

SUCCESS STORY: WIMAX STANDARDS BASED POINT TO MULTIPOINT CONNECTIVITY SOLUTION BETWEEN ONGC WHP & FPSO



Oil and Natural Gas Corporation Ltd.

Arya Communications and Electronics Services Private Limited was chosen by M/s Oil and Natural Gas Corporation Limited to provide 802.16d Wi-Max standards based point to multipoint connectivity between various offshore process platforms (PP) and various unmanned well head platforms (WHP) for extending Voice, Video & data connectivity in challenging marine environments. Project involves providing reliable connectivity solution for various offshore platforms under Cluster-7, B-127, MHN RD PH3, MHS RD PH3, Daman Development Project etc. on turnkey basis

Overview of Cluster-7 Project FPSO connectivity solution

A **Floating Production, Storage and Offloading** (FPSO) unit is a floating vessel used by the offshore oil and gas industry for the production and processing of hydrocarbons, and for the storage of oil. A FPSO vessel is designed to receive hydrocarbons produced by itself or from nearby platforms or subsea template, process them, and store oil until it can be offloaded onto a tanker or, less frequently, transported through a pipeline. Reliable communication infrastructure is needed to transmit critical information to and from WHP/ for automated exploring operations

The Challenge

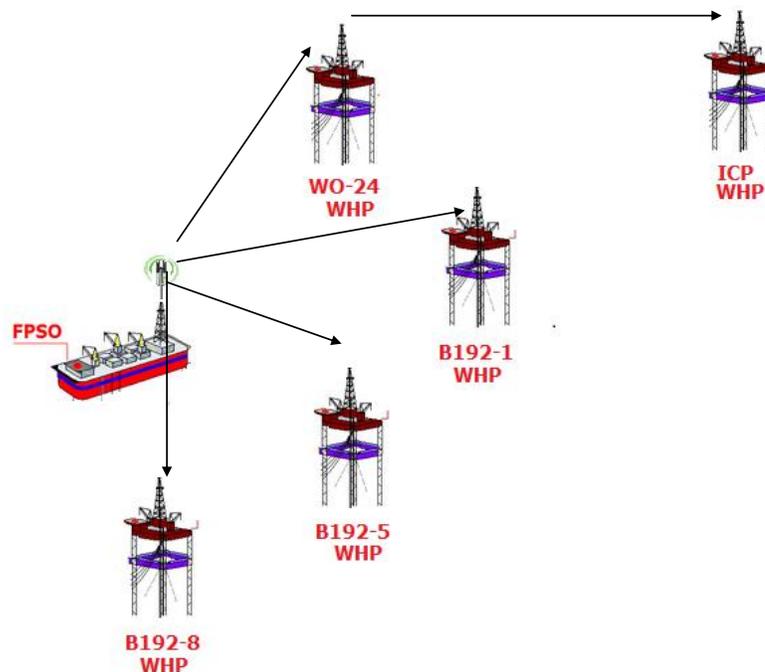
Establishing the point to multipoint communication on IEEE 802.16d Wi-Max based wireless platform at FPSO presents unique challenges like harsh marine environment in which marine waves cause motions such as roll, pitch etc, rotation of FPSO around axis, the elevation of antenna will vary based on the loading (presence of cargo) of the FPSO , it also include conflicting RF applications , the presence of dense steel structures and storage tanks.

Technologically the modern option gyro based tracking radio system has limitation as it caters only for point to point communication apart from having very high cost of implementation & required skilled manpower for operation & maintenance. It is not suitable for point to multipoint operation. So challenge is to design alternate, cost effective and reliable solution to meet the communication requirement.

The Solution

A wireless broadband network built using equipment from Telrad (Erstwhile Alvarion) BreezeMAX productline. Highlights of the solution are ;

- Four 90 degree sector base station at FPSO to cover 360 degree area.
- One micro base station to be connected with two (2) ODUs
- Two ODU's per sector to be used with 90 degree sectorial vertical polarized antenna so as to provide space diversity to counter changes in elevation of antenna due to FPSO operation, reflections & multipath as reflections off the water surface can play havoc with the received signal, leading to high levels of interference resulting in fading and ultimately a high level of errors and signal interruptions. With two ODU System gain will be increased by 3dB, this will increase the overall link reliability.
- Subscriber units (CPE's) will be programmed in Best AU Support – Enable mode so that it can latch to AU/Base station having strongest signal amongst four no installed sectors when FPSO is in rotation movement
- 90 Degree sectorial antennas of 14.5 dbi gain to be used at FPSO. One antenna will be 2 degree uptoilted and the other is -2 degrees placed vertically with separation of 5 -8 metres.
- As for pitch, as mentioned, one antenna will be 2 degree uptoilted and the other is -2 degrees. Vertical beamwidth of the BS antenna is 7 degree and it should be able to cover +/- 3.5 degree pitch changes. 2degrees is a more conservative approach .
- Thus Roll & pitch movements thus be covered with this scheme



SINGLE BASE SECTOR CONFIGUARTION REPRESENTATION

