ALTRON
NEXUS

Case Study

DE BEERS MARINE
– Point Link Solution

CLIENT
De Beers Marine

LOCATION
De Beers Marine Namibia
– Mv Benguela Gem

THE CHALLENGE
The MV Benguela Gem requires a Communication System to provide a bi-directional IP (data and video) feed between the shore and the vessel, which is to operate within the Atlantic 1 license area off the coast of Namibian.

The vessel is currently communicating to shore using a Line-of-Sight (LOS) Communication System which has become obsolete and requires replacement.

ESTABLISHED SYSTEMS/IT SOLUTIONS
The Line of Sight (LOS) Communication System provided limited ship to shore communication. The estimated throughput was <25mpbps. The growing need for information to be transferred from the vessel to shore, caused the client to investigate more efficient and cost effective technologies on the market.

ABOUT ALTRON NEXUS
Altron Nexus, formerly known as Altech Alcom Matomo, is an ICT products and services solutions provider that focuses on providing telecommunication services, spanning both narrowband and broadband networks - fixed and wireless.

Altron Nexus (Pty) Ltd is the holding company for the business units focused on two way radio distribution, turnkey ICT solutions and operating our own national radio network.

The company provides a variety of converged telecommunication products and services ranging from narrowband, wireless two-way radio communication networks across the entire ICT spectrum to broadband fibre networks. Altron Nexus is an accredited level 1 B-BBEE contributor.

BACKGROUND

Namibia has the richest known marine diamond deposits in the world and is among the top 10 producers of gem quality diamonds globally. The journey of offshore marine diamonds started billions of years ago when volcanic activity sent diamonds into the riverbed of the great Orange River, which over millions of years washed the diamonds into the Atlantic Ocean.

Debmarine Namibia is Namibia's leading marine diamond mining company and is a recognised world leader in marine diamond exploration and mining technology.

Debmarine Namibia is a joint venture marine diamond prospecting and mining company, owned in equal shares by the Government of the Republic of Namibia and De Beers. Debmarine Namibia is a wholly-owned subsidiary of Namdeb Holdings (Pty) Ltd.

Debmarine Namibia became operational in January 2002. Debmarine Namibia mines in the off-shore mining licence area off the southern coast of Namibia. The company operates five diamond mining vessels, namely Debmar Atlantic, Debmar Pacific, !Gariep, Grand Banks and Mafuta. Two mining technologies are deployed, the airlift-drill and the crawler mining technology. The mining vessels mine diamonds off the ocean floor using highly advanced drill technology and supported with sophisticated tracking, positioning and surveying equipment.

This national icon not only uses the most advanced marine diamond mining technology, but its people are shining stars in the Namibian mining industry with highly sought-after skills and specialised experience. Debmarine Namibia employs 800 human gems, of which about 90 are based at its head office in Windhoek and the rest are sea-going employees. The vessels operate on a twenty-eight days on, twenty-eight days off shift system.

Debmarine Namibia is ISO 14001, ISM and OHSAS 18001 certified, in line with its commitment to safety and environmental management. This commitment to sustainability has made Debmarine Namibia a shining example since it first started operating as a full Namibian company and will ensure that the company continues to unlock the sparkle in Atlantic 1 and make a meaningful contribution to the Namibian economy.

INTENDED OUTCOME(S)

The $486 million (~N$7 billion) custom-built vessel will add an additional 500,000 carats of high value diamonds to Debmarine Namibia's annual production, an increase of around 45 per cent, while creating 160 high-skilled jobs for Namibians.
The Benguela Gem joins the world-class Debmarine Namibia fleet, which has been responsibly recovering some of the world's highest quality diamonds.
The Benguela Gem was designed in Norway and Poland, built in Romania and fitted out with its

proprietary mission equipment by De Beers Marine South Africa. Taking two years to construct, it is the most technically advanced diamond recovery vessel in the world, underpinned by high standards of sustainability and safety performance.

The vessel combines latest technology and fully integrated design to achieve unrivalled efficiency, reliability and accuracy. A state-of-the-art dynamic positioning system automatically optimises the vessel's performance in changing weather conditions to minimise energy use. The vessel also generates its own fresh water through the use of heat recovery systems and a reverse osmosis plant. Employee wellbeing features were a priority in the vessel's design, with crew having access to entertainment systems, a gym, a hospital and relaxation facilities onboard.

Diamond recovery by Debmarine Namibia takes place at 90 to 150 metres below sea level and is the single biggest contributor to Namibia's economy. The additional 500,000 high value carats produced by Benguela Gem will add to the more than N$10 billion revenue that the partnership between De Beers Group and the Namibian Government delivers to Namibia each year.

THE TECHNOLOGY/SERVICE ADVANTAGE

Ceragon's PointLink Access is a marine-grade Point to Point (PtP) and Point to Multi Point (PtMP) connectivity system that provides a secured, high capacity, low latency solution, enabling your offshore and Maritime operations to meet your business objectives. It integrates highly reliable microwave equipment with customized antenna stabilization technologies as well as resilient paths and topologies to provide you high reliability and most importantly, peace of mind.

The modern ultra-light design of the PointLink Access enables effective communication to smaller vessels and mobile users, where the communication is based on a numerous technologies as; LTE/4G in licensed frequency bands, Wi-Fi in unlicensed bands and Microwave links in both licensed and unlicensed bands. The compact light weight design saves valuable deck-space, and with a total weight of approx. 25 kg (50 lb) including data modem, antenna and protective radome, the system easy to install on the vessel.

The PointLink Access system ensures the highest availability, regardless of propagation and weather conditions. The advanced software controls the orientation of the directional antenna, securing optimal link margin in systems deployed on moving vessels and platforms. The system features automatic switch-over between sectors in a multi-sector system, and automatic multi-homing in a distributed base station network. Dual axis actuators compensate for pitch & roll motions up to + 80 /- 30 degrees, with the help of motion sensors. Combined with accurate heading information from the GPS compass, the system ensures a unique pointing accuracy even under highly dynamic conditions.
The PointLink Access stabilized antenna platform is supplied as a dual axis system. The units are integrated in a protective 60 cm radome.

Ceragon offers turnkey solutions with a full range of services, including: field surveys, performance calculations, frequency planning, engineering, installation, testing and commissioning. After-sales support and service-level agreements guarantee top performance for the long term.

Ceragon's PointLink Access system ensures a smooth implementation, from concept to delivery, enabling you to have the peace of mind to run an efficient and safe operation that meets your business objectives and achieves the highest value for you.

KEY POINTS FOR EFFECTIVE PRACTICE

High capacity connections: >50 Mbps full duplex (max distance-80 km)

Link latency: less than 1ms Link availability for minimum capacity and maximum distance better than 99%

Link availability for 200 Mbps and 40km distance better than 99.99% Strong fade margin (>30dB) for minimum capacity & max distance

Network Management System with centralized operational and maintenance functions and northbound interface option to higher order OSS Robust engineering solutions to safeguard outdoor installations against extreme weather and corrosion.

Ceragon All-In-House solution: Microwave radios and stabilized antenna system and designed:

- To operate in excess of 15 years
- For marine environment
- To operate on wind speed up to 70 m/s , Humidity 100%RH
- To operate w/o cooling /heating for temperature range -15°C to +45°C
- For IP Grade IP 66

CONCLUSIONS AND RECOMMENDATIONS

Radio communications between the shore and moving vessels utilizes a stabilized PointLink system for azimuth and elevation control of microwave radio antennas which is designed specifically for use on floating offshore structures or on fixed platforms for communication to moving targets. Any combination of Yaw, Pitch and Roll movement of such a structure is automatically counteracted. The stabilized antenna system ensures that antenna beams are constantly aligned with the target when the vessel moves by moving the antenna with an opposite movement to the vessel.

The PointLink systems installed onto the fixed tower at Kerbehuk tracks the moving vessels. Each microwave connection will consist of a dedicated onshore PointLink antenna system. On the vessel a dual PointLink antenna system is required. This option allows for true 360° connectivity between the vessel and the ground station.

A high power RFU-D-HP radio is connected to the microwave radio antenna which has 35db (4&5 GHz) / 37dB (6/7 GHz) output power and a covered radome to protect both microwave and internal stabilization systems.

This proposed configuration is for very long links over the sea and in areas with difficult propagation conditions.
The link will benefit from small frequency diversity improvements by using two separate frequency carriers/connection from one dual core radio.

Both carriers have the capacity to support modulations from QPSK – 4096 QAM. The available capacity and modulation schemes are limited by capacity activation keys which are software activated by Ceragon. Current considered modulations are from BPSK to 32 QAM to deliver up to 100 Mbps per carrier. 200 Mbps capacity is possible with both radios having both cores activated running in an MC ABC configuration.

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