



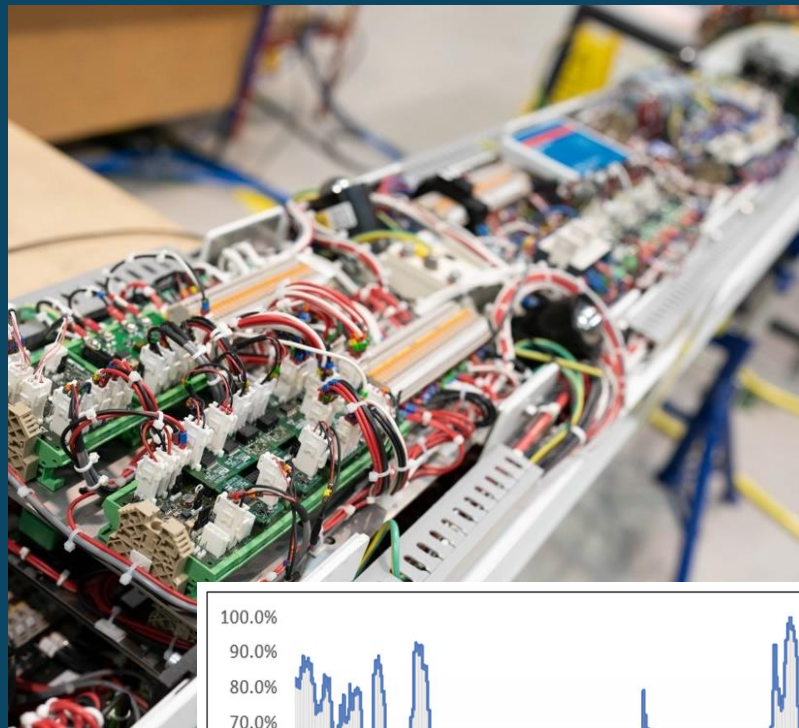
Daniel Willoughby
Lead Systems Engineer

verlume

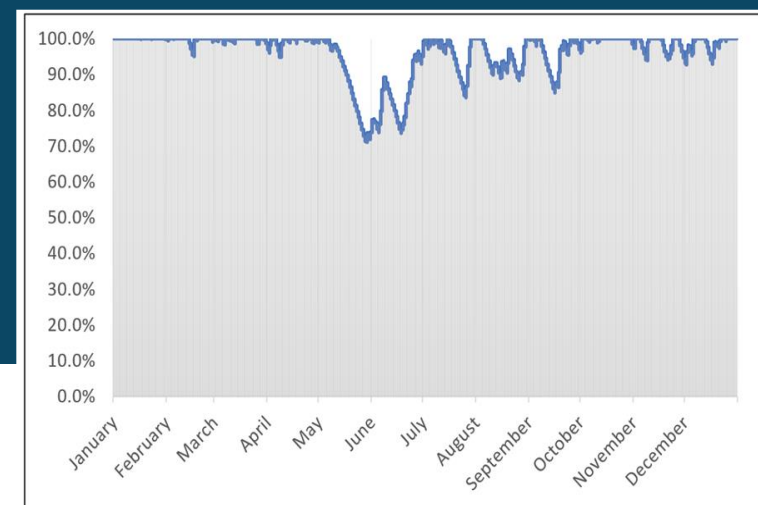
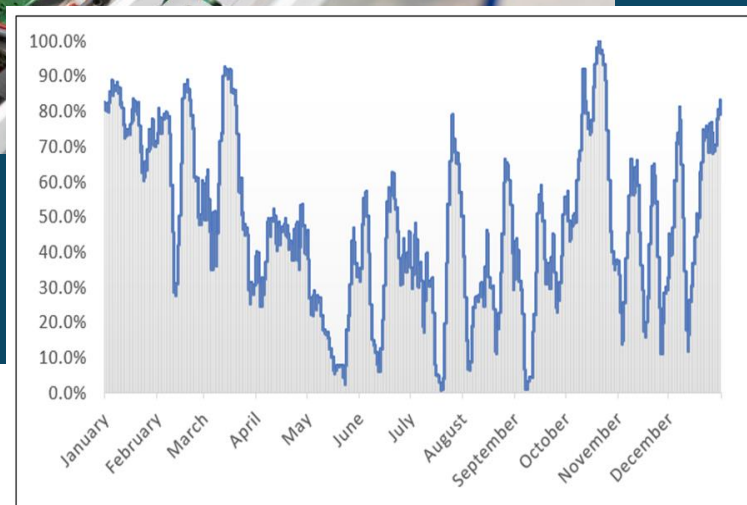
COMPANY OVERVIEW

Verlume is the world leader in advanced subsea power systems:

- Providing subsea batteries and power management systems to make offshore infrastructure more reliable and efficient.



Verlume's Axonn is the only system on the market providing fully autonomous decision making, power control of intermittent sources, health monitoring, and a communications gateway.



--- CASE STUDY ---

TEMPORARY POWER TO SUBSEA ASSETS: THROUGH WORLD-FIRST BATTERY- POWERED SOLUTION



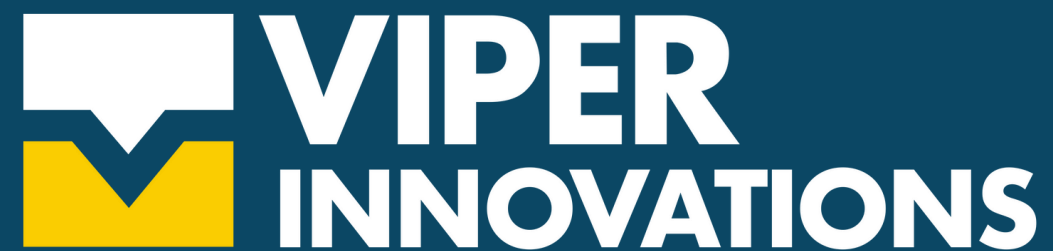
J+S SUBSEA, VIPER INNOVATIONS, VERLUME

COLLABORATION



J+S SUBSEA

Experts in design, engineering, operational support, and maintenance of subsea equipment.



VIPER INNOVATIONS

Electrical monitoring and protection for global industries including subsea and rail.



VERLUME

Subsea batteries and power management solutions for the energy industry.

THE PROBLEM



J+S Subsea were tasked with developing a means to maintain the electrical integrity of a subsea umbilical while an FPSO was off station for refurbishment for 1 year, such that when the FPSO returned the subsea production control system could be operated reliably.

This would require:

- Marinisation of a Viper V-SLIM circuit board.
- An energy source, i.e. a sizeable battery.
- A frame/housing and inter-connection system.

THE SOLUTION



- **Primary Objective:**

Design/engineer/manufacture a recoverable, subsea battery powered IR remediation system:

- Two primary systems + rotational spare
- To maintain continuous V-LIFE application for minimum of 90-day cycles
- Rechargeable on the deck of a CSV.

- **Secondary Objectives:**

- Utilise Legacy Locker
- Minimise carbon footprint

- **Six months to achieve this!**

THE SOLUTION

- Designed and manufactured 3-off 55KWh subsea-deployed systems to enable battery-powered operation of IR protection and recovery technology:
 - Capable of recharging on-deck/on-shore
 - Redeployable with further 90-days operability.
 - Interfaces with existing subsea infrastructure.
 - Installable and recoverable by the Multi Purpose Vessel (MPV) and its on-board ROVs.

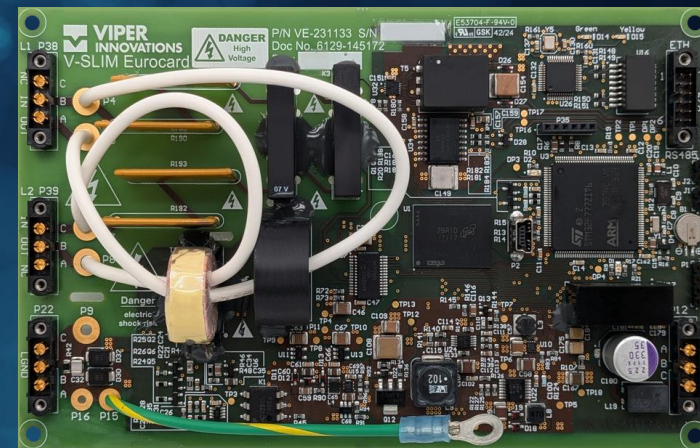


V-LIFE & V-SLIM TECHNOLOGY

- **V-SLIM - Subsea Insulation Protection and Monitoring Device**

- 1GΩ Insulation Resistance Measurement.
- 150μF Total Insulation Capacitance Measurement.
- <1000V Line Voltage.
- V-LIFE Ready.

V-LIFE®



V-SLIM®

- **V-LIFE - Insulation Resistance Protection**
- Transmission of a passivation signal between the system electrical power conductors and Earth to produce an electrokinetic/electrochemical effect that increases the Insulation Resistance.
- V-LIFE has been activated on this system for 3 years.

CHARGE BATTERY

Integrated Verlume's Charge system for continuous power delivery:

- 55KWh battery systems.
- Designed for minimum 90-day recharge cycle.
- Output voltage 24V.
- Fully rechargeable, pressure encapsulated.
- Autonomous, 'plug-&-play' fast charging.
- High energy density using state-of-the-art Lithium-ion battery technology.
- Integrated energy management system with remote access to health monitoring system.
- Battery life was estimated on history on real-life data, in different conditions.



THE OUTCOME



J-BIRRD - Battery-powered IR Remediation Device.

- Overall 3 units + smart charger delivered from Aberdeen to Canada in late 2023/early 2024.
 - #1 and #2 deployed 3-4th January 2024.
 - First recovery after 60 days, battery showing 50% remaining, safe operational cycle of >120 days.
 - #3 deployed March onto a third subsea channel.
-
- **Confident deployment, recovery and charge to 100 days.**

THE OUTCOME

- V-LIFE datalogs showed healthy IR between 4-10 MOhms.
- Still operating today, with the IR being kept in a healthy state.
- **Combined effort resulted in a reliable, quickly deployable solution.**
- **Ensured the continuous operation of the IR maintenance infrastructure for the client.**

IR Graph

Graph of IR of the selected asset

