

USU Technology Highlight:

# OCEAN CABLE CONSTANT-CURRENT RESONANT CONVERTER

*This DAB LCL-T resonant Technology offers generalized three angle modulation for active bridges to convert a DC current source into an outputted DC voltage for these power branching units.*

## PROBLEM

On the ocean floor, power branching units require an energy source across large distances. A cable connects to these power branching units from the shore. This cable must maintain its voltage and efficiency throughout the entirety of the cable to minimize the loss in energy. Between the cable and the power branching unit, a converter acts to tie the energy source to the load. This converter must maintain control, energy, and auxiliary power in the case of a cable fault.

## SOLUTION

To provide a system with a solution to this energy conservation across such distances, a constant current converter is provided. Constant current improves on efficiency over constant voltage with such distances. This converter transfers that constant current into a voltage and vice versa as needed. The technology provides the needed constant current through the cable, while allowing for a voltage input into the load.

## BENEFITS

The technology allows for bidirectional current transfer for simple processing as the circuit is DC, and controls the direction the current travels on the output side of the converter, so the power branching unit has its conventional current conforming with the electric current design. Three angle modulation makes use of electromagnetic induction, behaving as a form of control for the converter to regulate the percentage of energy transferred to the power branching unit as the angle for the mutual inductance shifts. The converter applies an auxiliary power supply for the case of a cable fault or systematic failure in the ocean.

## APPLICATIONS

Applications run through the Wire and Cable Manufacturing in the US industry with markets such as the Power Generation and Transmission Market and the Electricity Transmission and Distribution Operators Market. These supply energy to loads over distances scaling city grids, with application to cable faults and efficiency.

## CONTACT

Questions about this technology including licensing availability can be directed to:

### ALAN EDWARDS

*Manager*

Technology Transfer Services  
(435) 797-2328

[alan.edwards@usu.edu](mailto:alan.edwards@usu.edu)

## INVENTORS

### TARAK SAHA, PH.D.

*Electrical and Computer Engineering*

### ANINDYA BAGCHI, PH.D.

*Electrical and Computer Engineering*

### REGAN ZANE, PH.D.

*Electrical and Computer Engineering*

### HONGJIE WANG, PH.D.

*Electrical and Computer Engineering*

## DEVELOPMENT STAGE

TRL 4

## LICENSING

Available for License

## PATENT STATUS

Pre-Filing

## WEBSITE

<https://aspire.usu.edu/>

OFFICE OF  
**RESEARCH**  
**UtahStateUniversity®**