

CLAIMS

1. A system for transmitting electrical power and communication signals, comprising:

a transmission line (3);

a source of electrical power (5) for supplying electrical power to the transmission line;

first communication means (10), for supplying communication signals to the transmission line;

power extraction means (4) for extracting and using electrical power from the transmission line;

second communication means (11) for receiving communication signals from the transmission line; and

control means for controlling operation of the system in such a way that, in use of the system, the power source supplies electrical power to the transmission line for respective periods of time which are different from respective periods of time in which the first communication means supplies communication signals to the transmission line, wherein

said power extraction means includes electrical power storage means (7) for storing electrical power extracted from said transmission line, **characterised in that**

said control means is such that said first communication means can supply communication signals to said transmission line unless the voltage of power stored in said storage means drops below a threshold level, in response to which communication signals from said first communication means are not supplied to said line but electrical power is supplied to said line from said source until the voltage of power stored in said storage means is not below said threshold, in response to which said first communication means can supply communication signals to said transmission line.

2. A system according to claim 1, wherein said second communication means (11) is adapted for supplying communication signals to said transmission line (3) for reception by said first communication means (10) during periods of time when said power source (5) is not supplying electrical power to the transmission line.

3. A system according to any preceding claim, wherein said control means includes switch means (9) which, in a first condition, couples said power source (5) to said transmission line (3) and, in a second condition, couples said first communication means (10) to said line.

4. A system according to claim 3, wherein said control means is such that, if the voltage of power stored in said storage means (7) is below said threshold, said switch means is in said first condition but if it is not below said threshold said switch means is in said second condition.

5. A system according to claim 4, wherein said control means is such that said switch means (9) is switched between said conditions by signals from said second communication means (11).

6. A system according to any preceding claim, wherein said power source (5) is an AC power source, said extracting means comprising a transformer having a primary winding connected across said transmission line (3) and a secondary winding connected across rectifier means.

7. A system according to any preceding claim which comprises a control system for a subsea hydrocarbon well.

8. A system according to claim 7, wherein said power source (5) and said first communication means (10) are each at a topside location, said power extraction means and said second communication means are in a subsea electronics module (2) and said transmission line (3) is in an umbilical cable between said topside location and the subsea electronics module.

9. A system according to claim 7, wherein said power source (13) and said first communication means (16) are in a subsea electronics module (12), said power extraction means and said second communication means (20) are in a subsea sensor arrangement (18) and said transmission line (15) is between said subsea electronics module and said subsea sensor arrangement.

10. A method of transmitting electrical power and communication signals, the method comprising:

providing a transmission line (3), a source of electrical power (5), first communication means, power extraction means (4) for extracting and using

electrical power from the transmission line and second communication means (11) for receiving communication signals from the transmission line, which method further comprises controlling operation such that the power source supplies electrical power to the transmission line for respective periods of time which are different from respective periods of time in which the first communication means supplies communication signals to the transmission line,

wherein said power extraction means stores electrical power from electrical power extracted from said transmission line, **characterised in that**

said first communication means supplies communication signals to said transmission line unless the voltage of stored power drops below a threshold level, in response to which communication signals from said first communication means are not supplied to said line but electrical power is supplied to said line from said source until the voltage of stored power is not below said threshold, in response to which said first communication means supplies communication signals to said transmission line.

11. A method according to claim 10, wherein said second communication means (11) supplies communication signals to said transmission line (3) for reception by said first communication means (10) during periods of time when said power source (5) is not supplying electrical power to the transmission line.

12. A method according to any of claims 10 and 11, wherein switch means (9), in a first condition, couples said power source (5) to said transmission line (3) and, in a second condition, couples said first communication means (10) to said line.

13. A method according to any of claims 10 to 12, wherein, if the voltage of stored power is below said threshold, said switch means (9) is in said first condition but if it is not below said threshold said switch means is in said second condition.

14. A method according to claim 13, wherein said switch means (9) is switched between said conditions by signals from said second communication means (11).