

BRIEF SUMMARY

[0004] A blow-out preventer (BOP) may be improved by having a subsea processing unit located underwater with the blow-out preventer. The processing unit may enable the blow-out preventer to function as a blow-out arrestor (BOA), because the processing unit may determine problem conditions exist that warrant taking action within the blow-out preventer to prevent and/or arrest a possible blow-out condition.

[0005] According to a first aspect, an apparatus may include a first processor unit comprising: a housing; a processor disposed within the housing; and an inductive power receiving device coupled to the processor and disposed within the housing, the inductive power receiving device configured to receive power for the processor through the housing; an underwater drilling component, in which the underwater drilling component may include a physical receptor configured to receive ~~a~~ the first processor unit, and an inductive power transmitting device configured to transfer power to the inductive power receiving device of the first processor unit ~~through the physical receptor~~, and a wireless communications system configured to communicate with the first processor unit ~~through the physical receptor~~.

[0006] According to a second aspect, an apparatus may include a processor unit configured to be coupled to an underwater drilling component, the processor unit having: a housing; a processor disposed within the housing; an inductive power receiving device coupled to the processor and disposed within the housing, the inductive power receiving device configured to receive power for the processor from the underwater drilling component and through the housing; and a wireless communications system coupled to the processor and configured to communicate with an underwater drilling component.

[0007] According to a third aspect, a method of controlling an underwater drilling component may include ~~receiving power, at~~ powering a subsea processor unit, through an inductive coupling with the underwater drilling component, the subsea processor unit being coupled to a receptacle of the underwater drilling component, and communicating wirelessly, from the subsea processor unit, with the underwater drilling component to control the underwater

drilling component and decoupling the subsea processor unit from the receptacle without decoupling the receptacle from the underwater drilling component.

[0008] There is also disclosed an apparatus may include at least one subsea component of an underwater drilling tool; and at least one subsea processor configured to wirelessly communicate with the subsea component, in which the at least one subsea component and the at least one subsea processor are configured to communicate according to a time division multiple access (TDMA) scheme.

CLAIMS

What is claimed is:

1. An apparatus, comprising:
 - a first processor unit comprising:
 - a housing;
 - a processor disposed within the housing; and
 - an inductive power receiving device coupled to the processor and disposed within the housing, the inductive power receiving device configured to receive power for the processor through the housing;
 - ~~an underwater drilling component, in which the underwater drilling component comprises~~comprising:
 - a physical receptor configured to receive a the first processor unit; and
 - an inductive power transmitting device configured to transfer power to the inductive power receiving device of the first processor unit through the physical receptor; and
 - a wireless communications system configured to communicate with the first processor unit through the physical receptor.
2. The apparatus of claim 1, in which the apparatus further comprises sensors, in which the wireless communications system is configured to convey signals from the sensors to the first processor unit.
3. The apparatus of claim 1, further comprising:

a second physical receptor for a second processor unit; and

a third physical receptor for a third processor unit.

4. The apparatus of claim 3, in which the first processor unit, the second processor unit, and the third processor unit are configured to control the apparatus according to a majority voting scheme.
5. The apparatus of claim 1, in which the underwater drilling component is a blow-out preventer (BOP).

6. An apparatus, comprising:
 - a processor unit configured to be coupled to an underwater drilling component, the processor unit having:
 - a housing;
 - a processor disposed within the housing;
 - an inductive power receiving device coupled to the processor and disposed within the housing, the inductive power receiving device configured to receive power for the processor from the underwater drilling component and through the housing; and
 - a wireless communications system coupled to the processor and configured to communicate with an underwater drilling component.
7. The apparatus of claim 6, in which the wireless communications system is configured to receive sensor data from the underwater drilling component, and the apparatus further comprises memory configured to store the sensor data.
8. The apparatus of claim 6, in which the wireless communications system is configured to receive remote commands from at least one of an offshore network and an onshore network.
9. The apparatus of claim 6, in which the wireless communications system is configured to transmit commands to the underwater drilling component to control the underwater drilling component.
10. The apparatus of claim 9, further comprising a software model and wherein the processor is configured to control the underwater drilling component according to the software model.
11. The apparatus of claim 9, in which the wireless communications system is configured to retrieve an identifier from the underwater drilling component, and the processor is configured to control the underwater drilling component according to a model ~~matching~~ corresponding to the retrieved identifier.

12. The apparatus of claim 6, in which the wireless communications system is configured to communicate with other processors communicating with the underwater drilling component.

13. The apparatus of claim 12, in which the processor is configured to control the underwater drilling component according to a majority ~~vote~~ voting process with the other processors.
14. The apparatus of claim ~~12~~ 6, in which the ~~apparatus~~ housing is a single-piece, seamless unit.
15. A method of controlling an underwater drilling component, the method comprising:
 - ~~receiving power, at~~ powering a subsea processor unit, through an inductive coupling with the underwater drilling component, the subsea processor unit being coupled to a receptacle of the underwater drilling component; and
 - communicating wirelessly, from the subsea processor unit, with the underwater drilling component to control the underwater drilling component; and
 - decoupling the subsea processor unit from the receptacle without decoupling the receptacle from the underwater drilling component.
16. The method of claim 15, further comprising ~~placing~~ coupling the subsea processor ~~in a unit to~~ the receptacle of the underwater drilling component.
17. The method of claim 15, further comprising receiving, at the subsea processor unit, sensor measurements from the underwater drilling component.
18. The method of claim 15, further comprising issuing control commands to the underwater drilling component to control the underwater drilling component according to a model.
19. The method of claim 18, further comprising
 - receiving, at the subsea processor unit, an identifier ~~of~~ from the underwater drilling component; and
 - controlling the underwater drilling component according to a model corresponding to the identifier.

20. The method of claim 15, further comprising:

communicating wirelessly with other subsea ~~processors~~processor units; and

controlling the underwater drilling component according to a majority voting process between the subsea processor unit and the other subsea ~~processors~~processor units.