

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2575-seatex	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. PCT/NO2010/000267	International filing date (day/month/year) 06-07-2010	Priority date (day/month/year) 07-07-2009
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Kongsberg Seatex AS et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a.  (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:

sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b.  (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input checked="" type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 04-05-2011	Date of completion of this report 15-06-2011
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer  Sture Elnäs / EÖ Telephone No. +46 8 782 25 00

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Cover sheet

**International patent classification (IPC)**

**G01V 1/38** (2006.01)

**B63B 21/66** (2006.01)

**B63G 8/42** (2006.01)

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on:
- the international application in the language in which it was filed.
- a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- international search (Rules 12.3(a) and 23.1(b)).
- publication of the international application (Rule 12.4(a)).
- international preliminary examination (Rules 55.2(a) and/or 55.3(a)).
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- the international application as originally filed/furnished.
- the description:
- pages 1-19 \_\_\_\_\_ as originally filed/furnished.
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- the claims:
- pages \_\_\_\_\_ as originally filed/furnished.
- pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- pages\* 21-23 received by this Authority on 04-05-2011
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- the drawings:
- pages 1-6 \_\_\_\_\_ as originally filed/furnished.
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- a sequence listing – see Supplemental Box Relating to Sequence Listing.
3.  The amendments have resulted in the cancellation of:
- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (*specify*): \_\_\_\_\_
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)).
- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (*specify*): \_\_\_\_\_
5.  This report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2(e)).
6.  Supplementary international search report(s) from Authority(ies) \_\_\_\_\_ have been received and taken into account in drawing up this report (Rule 45bis.8(b) and (c)).

\* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO2010/000267

**Box No. II**      **Priority**

1.  This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
  - copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
  - translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2.  This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

The priority is considered valid. Accordingly, WO2009/088291 A1 is of no relevance.

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty (N)	Claims	<u>1-13</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	<u>1-13</u>	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	<u>1-13</u>	YES
	Claims	_____	NO

## 2. Citations and explanations (Rule 70.7)

The invention concerns a device for controlling the position of an instrument cable towed in water and solves the problem of integrating the sensor equipment into the system. The solution is to attach the transmitter/receiver to or into the wing of the marine seismic streamer.

## Cited documents

D1: US2006/0285434 A1

D2: US4033278 A

Document D1 is considered to represent the closest prior art. D1 describes a streamer steering device. The document discloses a body having fins that may be removably attached to the body, one or more acoustic sensors located within or on the body. The body may further comprise a rigid extension carrying sensors (part 0010, last three lines left column, nine first lines right column).

The invention according to claim 1 differs from the device in D1 in that the acoustic transmitter/receiver is located in or on the wing (fin).

Due to this feature, the measurement will be less sensitive to disturbances and get a better direction sensitivity.

Consequently, with the background of D1, the problem is to design a device with improved performance.

A solution to this problem is known from document D2, which describes a device for controlling positioning of a marine

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**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

seismic cable, where a sonar receiver is mounted on or into the wing (column 4, lines 40-46, figures 6,7).

Thus, the person skilled in the art, having the device known from D1 as a starting point, aiming to solve the identified problem, would with the knowledge of D2 attach the acoustic transmitter/receiver to or into the movable wing.

The invention according to claim 1 further differs from the cited documents by stating that the acoustic transmitter/receiver elements are arranged for direction controlled measurement of distances between adjacent control devices on parallel towed cables.

A control device (streamer) having acoustic transmitter/receiver arranged to or into a wing and arranged for measurements of distances between adjacent control devices is not known from the cited documents and is considered to be non obvious to the person skilled in the art.

Therefore, the subject matter defined in claim 1 is considered to involve an inventive step.

Consequently the invention claimed in claims 1-13 does fulfil the requirement of inventive step.

The invention is industrially applicable.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO2010/000267

**Box No. VI** Certain documents cited

## 1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
WO2009/088291 A1	16-07-2009	16-12-2008	09-01-2008

## 2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)
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**Claims**

1. Control device (10, 50) for controlling the position of an instrumented cable towed in water, such as a marine seismic streamer, and/or an instrumented towed cable array (streamer array)  
5 with the possibility of controlling the individual instrumented cables both with in shape and position in relation to other instrumented cables and by that counteract cross currents and/or other dynamic forces which affect a towed array behind a seismic survey vessel, which control device (10, 50) includes a main body (12, 53), wings (11, 52), connection means (14a-b) for mechanical and electrical connection of the control device (10, 50) in series between two adjacent  
10 sections of an instrumented cable, and drive means for controlling the respective angular position of the wings (11, 52) to control the lateral and vertical position of the instrumented cable, **characterized in** that the control device (10, 50) is provided with one or more acoustic means, such as acoustic transmitter/receiver elements (40), arranged to or integrated in one or more of the wings (11, 52) of the control device, which acoustic transmitter/receiver elements (40) are  
15 arranged for direction-controlled measurement of distances between adjacent control devices (10, 50) on parallel towed cables.

2. Control device according to claim 1, **characterized in** that the control device (10, 50) also includes one or more acoustic means, such as acoustic transmitter/receiver elements (40),  
20 arranged to or integrated within the main body (12, 53) of the control device or arranged to or integrated in detachable motor and drive gear housings (51).

3. Control device according to claim 1, **characterized in** that the wings (11) are adapted for electrical connection and signal connection to the adapted main body (12), or that the wings (11)  
25 and the main body (10) are provided with means (110) for wireless/contact-less transmission of energy and/or communication (signals/data) for transmission from main body (10) to wing (11), wing (11) to main body (10) or both ways, or that the motor and drive gear housings (51) of the control device are adapted for electrical connection and signal connection to the main body (53).

30 4. Control device according to claim 1, **characterized in** that the acoustic transmitter/receiver elements (40) are arranged to transmit acoustic signals/pulses in one or two directions.

5. Control device according to claim 1, **characterized in** that the acoustic transmitter/receiver elements (40) are directionally controllable, and have sensitivity along the instrumented cable to  
35 enable measurements along the instrumented cable.



- 5 6. Control device according to claim 1, **characterized in** that the transmitter/receiver elements (40) are arranged to transmit and receive broadband signals, such as DSSS signals ("DSSS – Direct Sequence Spread Spectrum"), which signals being specially designed to provide high auto correlation of the signal sequences to be detected, and low cross correlation properties against other sequences.
7. Control device according to claim 1, **characterized in** that the transmitter/receiver elements (40) are arranged to both transmit and receive signals/pulses.
- 10 8. Control device according to claim 1, **characterized in** that the control device (10) is provided with communication means, such as a transponder circuit card (150), for communicating between an external control system, such as APOS, and the transmitter/receiver elements (40).
- 15 9. Control device according to claim 8, **characterized in** that the transponder circuit card (150) is connected to the transmitter/receiver elements (40) and a control line and energy line of the instrumented cable, either directly through mechanical connections of the control device (10, 50) or through means (110) for wireless/contact-less transmission of communication and/or energy the control device (10).
- 20 10. Control device according to claim 8, **characterized in** that the transponder circuit card (150) is arranged to be commanded to transmit and/or listen.
11. Control device according to claim 8, **characterized in** that the transponder circuit card (150) includes three units/cards:
- 25 - a digital processing card (151) for encoding of signals and controlling when the transmitter/receiver elements (40) are to transmit and/or receive, signal processing, such as filtering and decoding of signals, including communication with an external control system such as APOS,
- a transmitter card (152) for DA conversion of control signal and excitation on the
- 30 transmitter/receiver element (40), and
- a receiver card (153) for amplification and AD conversion of received signal on the transmitter/receiver element (40).
12. Control device according to claim 1, **characterized in** that the transmitter/receiver element
- 35 (40) is designed like a "sandwich" element with a fastening point in the middle of an active

element and a "head" in each direction, or that the transmitter/receiver element (40) is designed as an active element of "composite" type casted in a suitable plastic material.

13. Control device according to claim 1, **characterized in** that the transmitter/receiver element  
5 (40) is arranged in a protective housing (41), which housing (41) being adapted to be arranged in the wing (11)/wing part (20) of the control device (10), which control device (10) for this is provided with protruding elements (42) at each side of the wing part (20), which protruding elements (42) being provided with through holes being adapted to the housing (41) for fixed arrangement of the transmitter/receiver element (40) via its housing (41) therein.

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