

From: Denis Klimov klimov@mbari.org 
Subject: Re: Geo-Sense Project- Updated Specification and Cable Design Inquiry
Date: July 23, 2024 at 2:44 PM
To: Aaron Schnittger aschnittger@mbari.org
Cc: Aaron Micallef amicallef@mbari.org, Alana Sherman alana@mbari.org, Richard Henthorn henthorn@mbari.org, Paul McGill mcgill@mbari.org, Bryan Touryan-Schaefer bryan@mbari.org

Hello All,

I captured some notes that while not quarantined to be comprehensive, is still something. Summary:

(1) Essentially what Solifos/ Patrick is outlining, is that there is capability, and a knowledge, of building a load-bearing cable, capable of DTS (Distributed Thermal Sensing), DAS (Distributed Acoustic Sensing), DSS (Distributed Strain Sensing), as well as having Copper conductors for thermal measurements, all without compromising performance.

(2) However, use of all three modes (DTS, DAS, and DSS), require 3-channel interrogator.

(3) Patrick is requesting to build a prototype cable at first, especially for a more complex design involving strain measurement members.

Please see further details below, and please let me know if I got anything outrageously incorrect.

(see the attached Notes, including pictures presented)

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Notes, meeting Solifos - MBARI, July 17, 2024, 09:00 PST

Solifos: Patrick Weissinger

MBARI: Aaron Micallef, Aaron Schinittger, Denis Klimov

Location: Zoom

Patrick: got specifications, worked with design engineers, pretty similar with some modifications. Screen sharing. Winch compatibility, 200 mm bend radius. Load, at least 50 kN, doable. 17 kN, working range. Working depth 2000 bar for inner tube; plus the outer armor; well specked for 2000 meters. Termination: will need some specifications or drawings.

Denis: what about torque balancing?

Patrick: should be torque balanced. Two layers, with different tensile strengths.

Denis: is it possible to do residual torque measurements?

Patrick: Can do the all tests per EAC-6794, can find out.

Denis: for ROV applications, sometimes vertical suspension in deep water is used to "un-twist" the cable, as it is going to be used in a similar (vertical) configuration. However, for our use, on the bottom, more or less horizontally, this method of untwisting does not work, so we are trying to gauge what the torque balance specs could be from the factory.

Patrick: ok this is interesting information, vertical suspension of the cable and all.

Denis: some companies such as TMT doing the cable termination, have capability of measuring parameters such as elongation and torque as a function of a load (and breaking strength) on a piece of a test cable.

Aaron S: what is the internal structure?

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Patrick: Stress sensing element, DSS V4 diameter 2.4mm, optional V4 element. BRUsens Strain Sensing Cable. BRUsens DSS 3.2mm V4 Metallic. For a more complex design cable, especially, building first a prototype cable is needed.

Aaron M: can it be used for acoustic sensing, not just strain sensing?

Patrick: yes, it can be. The fiber must be in contact with the tube. Metal members are blocking acoustic waves, so outer layers are better for sensing, that is where DAS fiber should be located

Aaron M: AcoustoSense?

Patrick: Fibercore fiber is a competitor to OFS.

Denis: what about the final cable configuration? How many sensing fibers?

Patrick: yes, one sensing element for acoustic. LT Acoustic Sensing in the outer layer. Multi-purpose cable in the day of the day. Fiber tube in the middle.

Aaron M: what about thermal sensing fiber?

Patrick: yes, temperature sensing element is needed for use with strain sensing, to decouple thermal effects from strain effects.

Denis: what about a simplified, specific cable for sensing only, could it be higher performance potentially, compare to load-bearing cable?

Patrick: not really, a cable with strength elements can be made as sensitive, if done right. With a simple cable, deployment will be more difficult. The cable design can be optimized by placing elements in right locations. Also, possible copper elements for heating the cable, and measure the temperature, too, to measure thermal coupling.

Denis: thermal load measurement is an interesting option.

Aaron S: how long could the cable last underwater?

Patrick: example of the cable lasting 12 years. Bitumen, hydrogen absorption gel around the fiber. 6-7 euro / meter

Denis: can we selected the options for the cable, then?

Patrick: choice between DTS, DAS, DSS (Distributed Thermal Sensing; Distributed Acoustic Sensing; Distributed Strain Sensing), as well as Copper conductors.

Aaron S.: ok we will discuss those options and will get back to you.

=====

Denis Klimov

From: "Aaron Schnittger" <aschnittger@mbari.org>

To: "Patrick Weissinger" <patrick.weissinger@solifos.com>

Cc: "Aaron Micallef" <amicallef@mbari.org>, "Alana Sherman" <alana@mbari.org>, "Denis Klimov" <klimov@mbari.org>, "Richard Henthorn" <henthorn@mbari.org>, "Paul McGill" <mcgill@mbari.org>, "Bryan Touryan-Schaefer" <bryan@mbari.org>, "Todd Walsh" <todd@mbari.org>

Sent: Wednesday, July 17, 2024 8:41:31 AM

Subject: Re: Geo-Sense Project- Updated Specification and Cable Design Inquiry

Sorry that was wrong!

Here is the actual link:

[https://mbari.zoom.us/j/82128931314?
pwd=MIJGLaJAKBEx6m9Hla19Cel1pkT9K1.1](https://mbari.zoom.us/j/82128931314?pwd=MIJGLaJAKBEx6m9Hla19Cel1pkT9K1.1)

Aaron Schnittger
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Monterey Bay Aquarium Research Institute
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From: "Aaron Schnittger" <aschnittger@mbari.org>
To: "Patrick Weissinger" <patrick.weissinger@solifos.com>
Cc: "Aaron Micallef" <amicallef@mbari.org>, "Alana Sherman" <alana@mbari.org>, "Denis Klimov" <klimov@mbari.org>, "Richard Henthorn" <henthorn@mbari.org>, "Paul McGill" <mcgill@mbari.org>, "Bryan Touryan-Schaefer" <bryan@mbari.org>, "Todd Walsh" <todd@mbari.org>
Sent: Wednesday, July 17, 2024 8:39:42 AM
Subject: Re: Geo-Sense Project- Updated Specification and Cable Design Inquiry

Here is the link:

<https://mbari.zoom.us/j/kb96Q7oLLD>

Aaron Schnittger
Associate Engineer
Monterey Bay Aquarium Research Institute
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Email: aschnittger@mbari.org

From: "Aaron Schnittger" <aschnittger@mbari.org>
To: "Patrick Weissinger" <patrick.weissinger@solifos.com>
Cc: "Aaron Micallef" <amicallef@mbari.org>, "Alana Sherman" <alana@mbari.org>, "Denis Klimov" <klimov@mbari.org>, "Richard Henthorn" <henthorn@mbari.org>, "Paul McGill" <mcgill@mbari.org>, "Bryan Touryan-Schaefer" <bryan@mbari.org>, "Todd Walsh" <todd@mbari.org>
Sent: Wednesday, July 17, 2024 8:37:15 AM
Subject: Fwd: Geo-Sense Project- Updated Specification and Cable Design Inquiry

Hi All,

Todd bailed me out and got us a zoom link with short notice-Thanks Todd!

For those MBARI-ians that are available to meet with Patrick please use the forwarded link.

See you at 9am and 6pm Swiss time,

Aaron Schnittger
Associate Engineer
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Email: aschnittger@mbari.org

From: "Todd Walsh" <todd@mbari.org>
To: "Aaron Schnittger" <aschnittger@mbari.org>
Cc: "Cindy Hanrahan" <jocy@mbari.org>
Sent: Wednesday, July 17, 2024 8:05:52 AM
Subject: Re: Geo-Sense Project- Updated Specification and Cable Design Inquiry

Hey Aaron,

Here you go. I don't think you need me to join necessarily, but I will be host and then hand that off to you.

You can share this with everyone else:

Topic: Geo-Sense
Time: Jul 17, 2024 09:00 AM Pacific Time (US and Canada)

Join Zoom Meeting
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[pwd=MIJGLaJAKBEx6m9HIa19Cel1pkT9K1.1](https://mbari.zoom.us/j/82128931314?pwd=MIJGLaJAKBEx6m9HIa19Cel1pkT9K1.1)

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Passcode: 639812

Find your local number: <https://mbari.zoom.us/j/82128931314>

Let me know if you have any questions. I'm actually headed your way with one for you lol

Thanks!

Todd

From: "Aaron Schnittger" <aschnittger@mbari.org>
To: "Cindy Hanrahan" <jocy@mbari.org>, "Todd Walsh" <todd@mbari.org>
Sent: Wednesday, July 17, 2024 7:17:36 AM
Subject: Geo-Sense Project- Updated Specification and Cable Design Inquiry

Hi Cindy,

Sorry for the late(or early) notice but is it possible to have either of you set up a zoom link for me? At 9am this morning 7/17?

The cable rep Patrick Weissinger <patrick.weissinger@solifos.com> is in Switzerland sent me confirmation(at 1 am) that he was available at 9am this morning to meet.

Mbari attendees are below:

Denis Klimov <klimov@mbari.org>; Aaron Micallef <amicallef@mbari.org>; Paul McGill <mcgill@mbari.org>; Alana Sherman <alana@mbari.org>; Richard Henthorn <henthorn@mbari.org>

Thanks for help and again sorry for the late notice

Thanks for help and again sorry for the late notice,

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