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Hands On Wildlife Life Biologist
B.S Ecology, Evolution &
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Title:
While wearing HECS electrical energy blocking technology wetsuit divers frequently report being much warmer than previously experienced when wearing a regular wetsuit of the same thickness. There may be some measurable degree of advanced thermal retention taking place within the carbon yarn that is part of the HECS technology

Abstract:
This study was conducted to determine if when wearing electromagnetic blocking technology incorporated into a wetsuit, there is a measurable decrease of the rate at which divers loose thermal energy, thus keeping the user warmer for a greater length of time and making for a more enjoyable dive experience. What was discovered was that once all variables of water temperature, time of day, sun exposure, time in the water etc. were constants we were able to analyze simply whether or not being in electromagnetic blocking technology actually insulates energy and keeps the diver warmer. The findings of this study, based on an experiment using thermal radiation measuring technology, leads us to believe that the electromagnetic reception blocking technology in a HECS wetsuit does indeed reduce thermal loss and overall keep's the diver warmer when compared with another wetsuit of the same thickness.

Introduction:
Part of enjoying time in any water is being comfortable. The main factor for comfort in the water is warmth; at times this comes from wearing incredibly thick wetsuits, which are extremely buoyant. This buoyancy then has to be countered by adding weight for the user to be able to dive, making the whole thing a bulky uncomfortable experience. If a company is able to invent a technology that keeps divers warmer for longer in a thinner wetsuit the user ultimately ends up being far more comfortable and having a more enjoyable aquatic experience.
By incorporating HECS electromagnetic blocking technology into a wetsuit a potential side effect to blocking the bodies naturally occurring electrical energy may be keeping the user in said wetsuit warmer. The reason being that electromagnetic energy is energy and any time energy is contained it creates a surplus, often translating into heat. In this instance we test to see if we retain 95% (based on findings from trifield meter reading in office- see video.) of the

body's electrical magnetic signals within the wetsuit if that radiation creates a heating effect.
By quantifying if wearing HECS electromagnetic blocking technology does indeed allow the diver to stay warmer, we can then venture to suggest that thinner HECS wetsuits do an equally effective job of keeping the diver warmer as a thicker non-HECS wetsuit; ultimately making for a more pleasurable dive experience for the user.

Methods and Materials:
In order to determine the effectiveness of HECs technology as an insulator within a wetsuit a study needed to be conducted, that with all equal variables tested a HECS wetsuit against a non-HECS wetsuit of equal thickness (5mm) in the same temperature water (60°F) with the same diver (subject X).

An initial water temperature reading was recorded using a dive watch. An initial air temperature reading was recorded using a thermometer. A post experiment water temperature reading was recorded using a dive watch. A post experiment air temperature reading was recorded using a thermometer. All of these variables remained constant.

All thermal readings were measured using a FLIR One thermal imaging camera. Subject X is the one conducting this study; biologist Forrest Galante. All data was recorded and measured by zoologist Jessica Evans. The entire experiment was filmed and photographed for reference.

The simple study was conducted using the following steps for greatest accuracy and to reduce all outside variables.

1) Subject X would take an initial no shirt thermal reading of the center of his chest and face. The data was recorded.

2) Subject X would then submerse himself in the ocean in a non-HECS wetsuit for 10 minutes then immediately take a thermal reading.

3) Subject X would remove wetsuit and take a secondary no shirt thermal reading of the center of his chest and face and would not begin to put on the HECS wetsuit until the secondary thermal reading matched the initial thermal reading as referenced in step 1.

4) Subject X would then submerse himself in the ocean in a HECS wetsuit for 10 minutes then immediately take a thermal reading.

Control factors include: using 2 wetsuits of the same thickness (5mm.), conducting the study in a short span of time to eliminate changing climatic variables, using the same diver (Subject X) for thermal readings in both wetsuits, filming the entire experiment for reference at a later date and using a high quality thermal imaging device capable of measuring minute differences as small as 0.18° F (0.1° C)

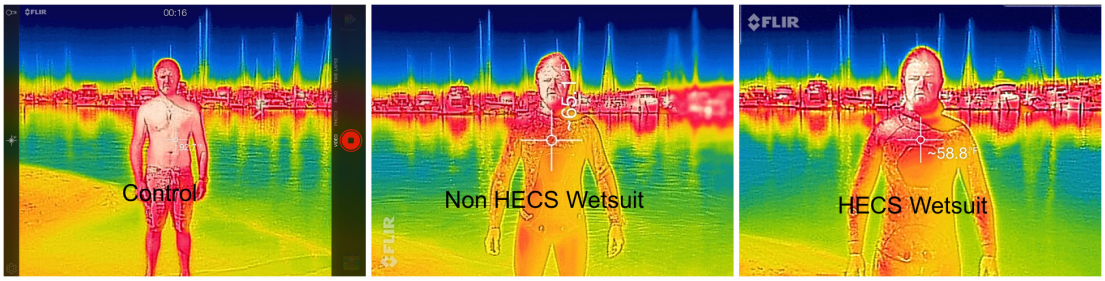
Data:

	Before Experiment (9:40am)	After Experiment (10:20am)
Air Temperature	70°F	70° F
Water Temperature	60°F	60°F

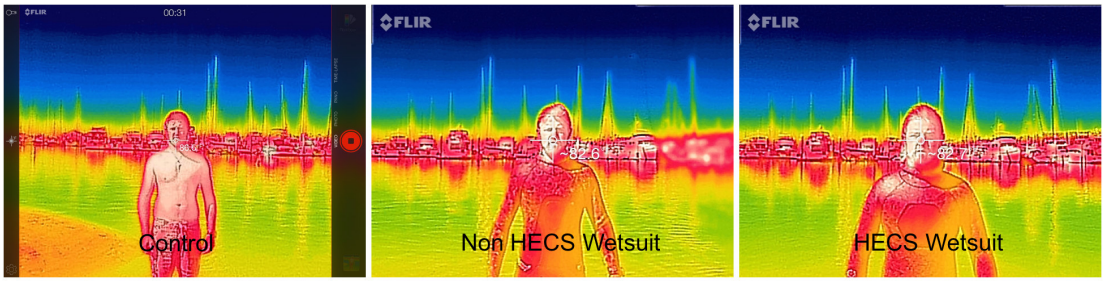
* As is shown here the air and water temperature did not fluctuate during the course of this study.

Thermal Image Recordings:

Chest



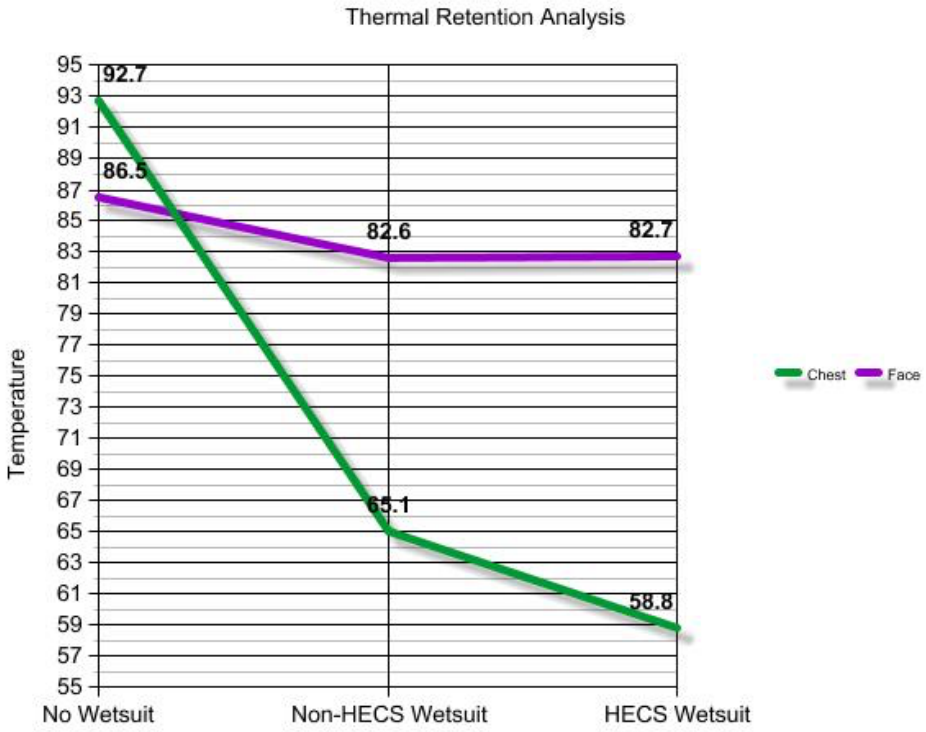
Face



	No Shirt (Control) before 1	before 2	Non-HECS Wetsuit after 10 minutes	HECS wetsuit after 10 minutes
FLIR Chest Temp	92.7°F	92.7°F	65.1°F	58.8°F
FLIR Face Temp	86.5°F	86.5°F	82.6°F	82.7°F

As seen in the images as well as the dataset above a measurable difference in temperature was recorded. The control temperature was a constant for both before the non-HECS wetsuit and before the HECS wetsuit allowing little room for thermal recording error.

In order to determine whether or not the HECS technology actually kept the user warmer we took away all variables and simply plotted 2 changes in temperature in a controlled environment while comparing wetsuits for 2 body parts, the chest- covered in wetsuit material and the face- not covered in wetsuit material.



When compared with our control what we discovered here is that after 10 minutes we measured a **6.3°F** difference in the chest and a **0.1°F** difference in the face.

Observing that the measurable chest temperature difference is indeed **6.3°F** cooler in the HECS wetsuit would mean that the HECS technology is indeed keeping you warmer allowing for less heat loss through the rubber as measured by the FLIR One thermal imaging device.

Due to the limited change in facial temperature, the fact that it was not submerged or covered in either wetsuit material it is considered a non-conclusive data set. However were we to quantify the limited change in facial temperature reading we would conclude that due to the core being warmer and loosing less energy in the HECS suit the face actually reads a slightly higher temperature as seen in both the data and images above.

<u>Discussion:</u>

Our results conclude that using HECs technology does keep the user warmer. By measuring thermal energy release we see that in the body part covered by the two different wetsuit materials (chest) there was significantly less heat loss in the HECS wetsuit. Although not scientifically quantifiable, Subject X did also report feeling warmer in the HECS wetsuit. It is the policy of the author of this paper to conduct multiple studies yielding the same or similar results before undeniably definitively concluding that HECS does keep you warmer, with that said this is a very good and measurable introduction to advanced thermal energy

retention by the HECS wetsuit and it is fully believed by the author that the HECS wetsuit does keep the user warmer.

More tests should be conducted to see the effects of electromagnetic blocking technology as to how they relate to thermal energy retention in the marine environment. Once an increased understanding of heat retention within a HECS wetsuit is reached it can then be determined what thickness HECS wetsuit has the same warming effects as a thicker non-HECS wetsuit ultimately leading to more comfortable and more enjoyable aquatic experiences for the user. Having this more enjoyable and less cumbersome aquatic experience may increase general public ocean activities, which eventually leads to more people caring about the marine world and its resources. A better wetsuit may indeed end up leading to better ocean conservation worldwide.

Thermal assessment by:

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