

## European Solar and Energy Storage Solutions

# Mesodyne lightcell Faroe Islands



## Overview

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How does mesodyne's lightcell convert fuel into electricity?

Mesodyne's LightCell converts fuel into electricity via light. Unable to load video. Try again later. Mesodyne's patented LightCell™ power generator converts any fuel into electricity via light. The core of the LightCell is a nanophotonic material that is engineered to only emit certain wavelengths of light when heated.

Why is mesodyne more efficient than traditional thermophotovoltaics?

Mesodyne's generator is significantly more efficient than traditional thermophotovoltaics because the light emitted by the nanophotonic material nearly perfectly matches what the PV cell can convert into electricity. Mesodyne's founders demonstrated the world record efficiency for this type of energy conversion in 2017 during their PhDs at MIT.

Who is mesodyne?

We founded Mesodyne shortly after we demonstrated the world record efficiency for thermophotovoltaic energy conversion at MIT in 2017. At our advisors' recommendation, we took entrepreneurship classes, started to conduct customer interviews, and saw real interest in the technology.

Who are mesodyne's co-founders?

Mesodyne's Co-Founders, Dr. Veronika Stelmakh and Dr. Walker Chan. Image courtesy of Argonne National Laboratory. We founded Mesodyne shortly after we demonstrated the world record efficiency for thermophotovoltaic energy conversion at MIT in 2017.

Why did mesodyne join Luminate?

From there Mesodyne participated in Chain Reaction Innovations, the WERC Bench Labs Accelerator, the Air Force Techstars, the Air Force Mass Challenge, and now Luminate. When we joined Luminate, the goal was to

expand our network, specifically in optics and photonics.

Is lightcell safe?

Is it safe?

The exterior of the LightCell is touch safe. The combustion process is contained inside the microcombustor and most of the heat is recovered out of the exhaust stream, reducing the exhaust temperature to a safe level. How is this different from conventional thermophotovoltaics?

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### FAQ -- Mesodyne

In the LightCell, a small microcombustor heats a photonic crystal to incandescence. This nanophotonic material is engineered to emit certain wavelengths of light preferentially when heated. The emitted light drives photovoltaic cells to generate electricity without moving parts with unprecedented efficiency at this scale - no specialized fuel

### LightCell(TM) , Thermoelectric generator , Nanotechnology Products ...

Mesodyne's patented LightCell(TM) power generator converts any fuel into electricity via light - increasing the endurance of small systems by 10X over batteries. Mesodyne's patented LightCell(TM) power generator converts any fuel into electricity via light. The core of the LightCell is a nanophotonic material that is engineered to only emit



### How it works -- Mesodyne

The LightCell increases the endurance of fixed wing UAVs by 10X compared to batteries alone. Increased endurance is particularly useful when the UAV needs fly to a remote inaccessible site, perform its mission, and return. Low vibration ...

## NobleReach Emerge & Mesodyne

Mesodyne's LightCell is a portable solution designed for defense use cases, where it can be carried by soldiers as a drone charging system that extends flight time by over 10x. Mesodyne's innovative product is also 75% lighter than existing battery solutions, making it a viable option for consumer applications, as well.



## National Defense Magazine , MIT Climate Portal

National Defense Magazine reporter Sean Carberry spotlights Mesodyne, an MIT startup that is developing a thermal photovoltaic power generator that could be used to help extend battery power during military missions. Mesodyne's LightCell generator can deliver "high-efficiency direct current power from a quiet device with no moving parts that could change the ...

## TECHNOLOGY SUMMARY

Mesodyne's LightCell is completely silent, has no moving parts, operates on any fuel, and has up to 10X the energy density of lithium ion batteries. LightCell technology enables new capabilities for unmanned small systems: increased endurance over batteries, improved reliability over internal combustion, fuel flexibility over fuel cells, and



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capabilities for unmanned small systems: increased endurance over batteries, improved reliability over internal combustion, fuel flexibility over fuel cells, and more.



## Tech Company Charging into Soldier Power

Mesodyne's LightCell generator -- about the size of a loaf of bread and roughly eight pounds -- puts out five-to-10 times the wattage per pound of current tactical batteries, Veronika Stelmakh, CEO and co-founder of Mesodyne, said during an interview at the Fed Supernova conference.



## Mesodyne -- Nor'easter Ventures

The Mesodyne LightCell(TM) converts fuel to electricity via light. LightCells(TM) are silent, have no moving parts, operate on any hydrocarbon fuel, and store 10x the energy of lithium ion batteries of equal weight. Mesodyne is building a set of portable power products that generate long endurance power for remote unmanned systems, drones and

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## Mesodyne

With more than 10x the energy density of Li-Ion batteries, the LightCell enables people, sensors, autonomous vehicles - virtually any system that requires portable power - to perform their mission beyond what is possible today and extend range, endurance, and ...

## Mesodyne

Developed at MIT's Institute for Soldier Nanotechnologies, incubated at Chain Reaction Innovations at Argonne National Lab, and accelerated by Techstars, Mesodyne's patented LightCell technology enables long endurance, reliable, efficient, silent power for remote unmanned sites and systems, drones and robots, warfighters and emergency



 LFP 48V 100Ah

## Mesodyne: Converting Fuel to Electricity Via Light

In Mesodyne's LightCell(TM), a microcombustor heats a nanoengineered photonic crystal material to incandescence, which shines light on the photovoltaic (PV) cell, generating electricity. My co-founder, Dr. Walker Chan, and I developed the technology at MIT's Institute for Soldier Nanotechnologies with the soldier in mind.



## Veronika Stelmakh

Dr. Veronika Stelmakh is the CEO and cofounder of Mesodyne, an MIT spin out commercializing a new class of power generator that converts fuel to electricity via light. Mesodyne's LightCell(TM) generator is silent, has no moving parts, operates on most commercial and military fuels, and offers up to 10x the energy density of lithium ion batteries for long endurance missions. Dr. ...



## Team 1 -- Mesodyne

Dr. Walker Chan is the cofounder and CTO of Mesodyne, where he leads the team of engineers designing the LightCell's integration into products for use across military and commercial applications. He serves on the company's Board of Directors and is an expert in thermophotovoltaics, thermofluids, combustion systems, and high temperature

## How it works -- Mesodyne

The LightCell increases the endurance of fixed wing UAVs by 10X compared to batteries alone. Increased endurance is particularly useful when the UAV needs fly to a remote inaccessible site, perform its mission, and return. Low vibration from Mesodyne's static conversion process is

needed for accurate imaging.



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