Small Business Innovative Research Program (SBIR) Topic: "Self-Sustaining Intelligent Pavement Systems"

SOLAR ROADWAYS
A Real Solution

North Eastern States Materials Engineers Association Meeting (NESMEA)

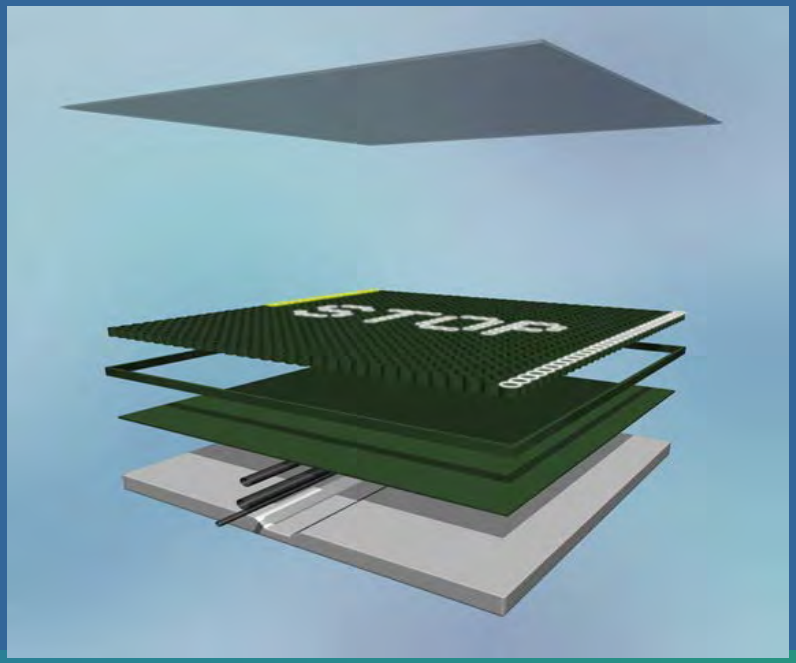
Eric Weaver - FHWA
October 18, 2016

SBIR Topic 091-FH5: "Self-Sustaining Intelligent Pavement Systems"

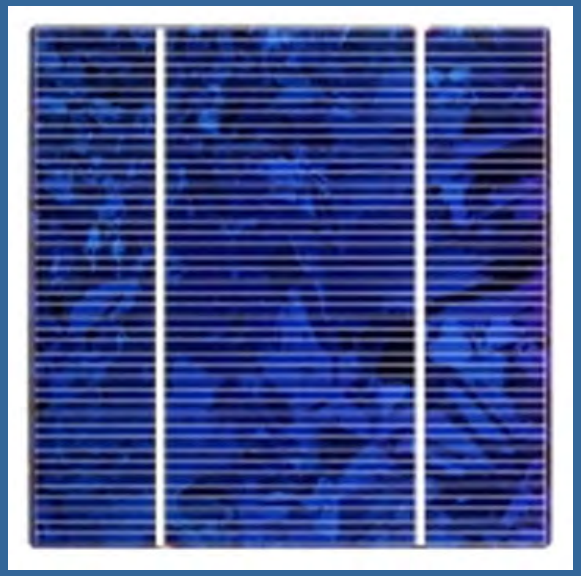
- generates its own power…
- transfers the power generated …
- made of recycled or other sustainable materials….
- modular for ease of replacement….
- durable enough to withstand repeated loading from traffic
- meets or exceeds safety characteristics …
- mitigates water runoff …
- cost that allows it to be economically self-sustaining…

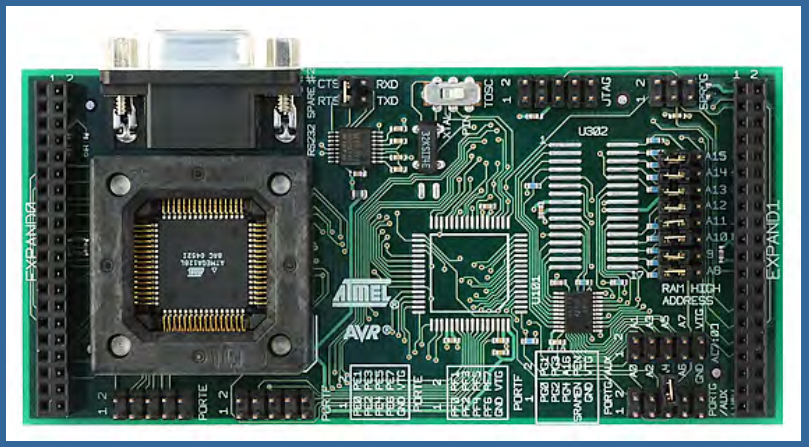
SBIR Topic 091-FH5: "Self-Sustaining Intelligent Pavement Systems"

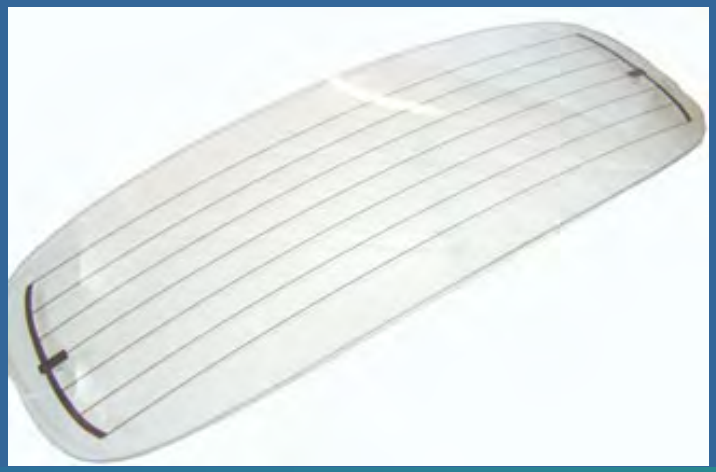
- 2 Phase I awards in 2009 at $100k each
- 1 Phase II award to Solar Roadways in 2011 at $750k
- Phase IIB award at $750k for durability and viability evaluation



Components




EXPAND2
EXPAND1
RXD
TXD
CTS
RTS
JTAG
U302
AVR
RAM HIGH ADDRESS
PORTE
PORTF
PORTG



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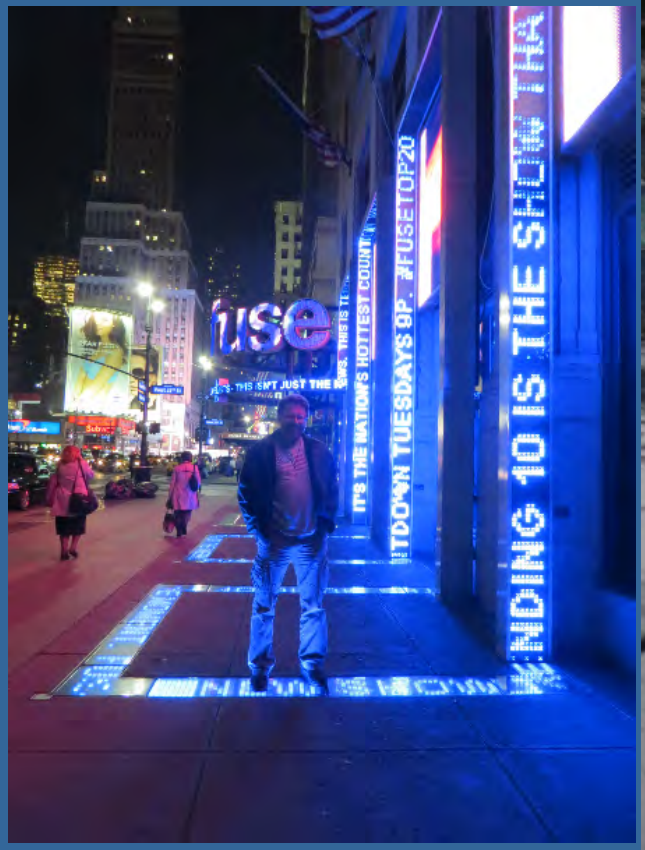
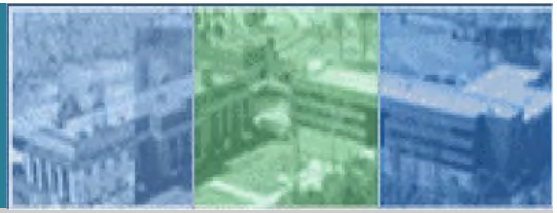
Potential early application: Glass Sidewalks



U.S. Department of Transportation
Federal Highway Administration



Engineered, tempered, low-iron glass tests

Traction testing

British Pendulum Test

Load testing

ASTM Standard C1161, 2002c (2008)e1 "Standard Test Method for Flexural Strength of Advanced Ceramics at Ambient Temperature“

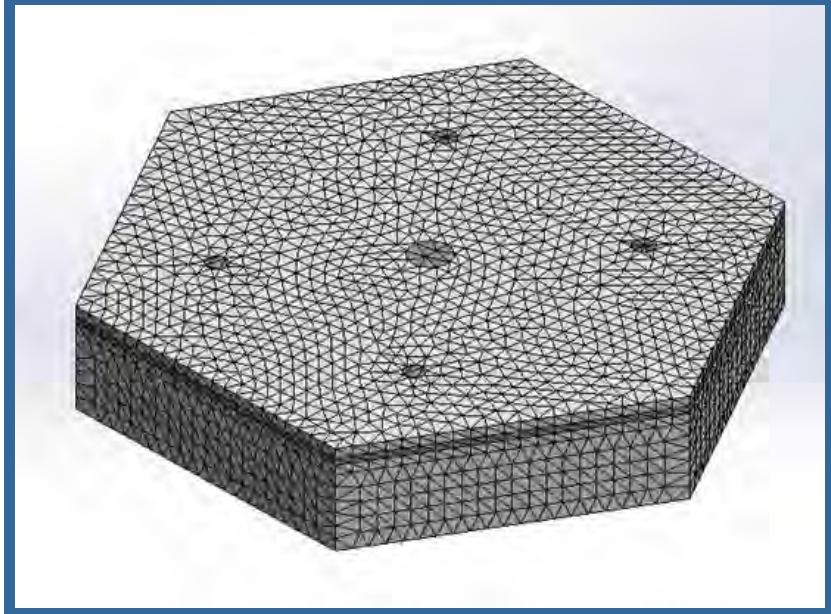
Impact resistance testing

Standard Test Method for Ball Drop Impact of Laminated Architectural Flat Glass”, Glass Association of North America (GANA). 1.875” steel balls (0.922 pounds) dropped from 10-feet

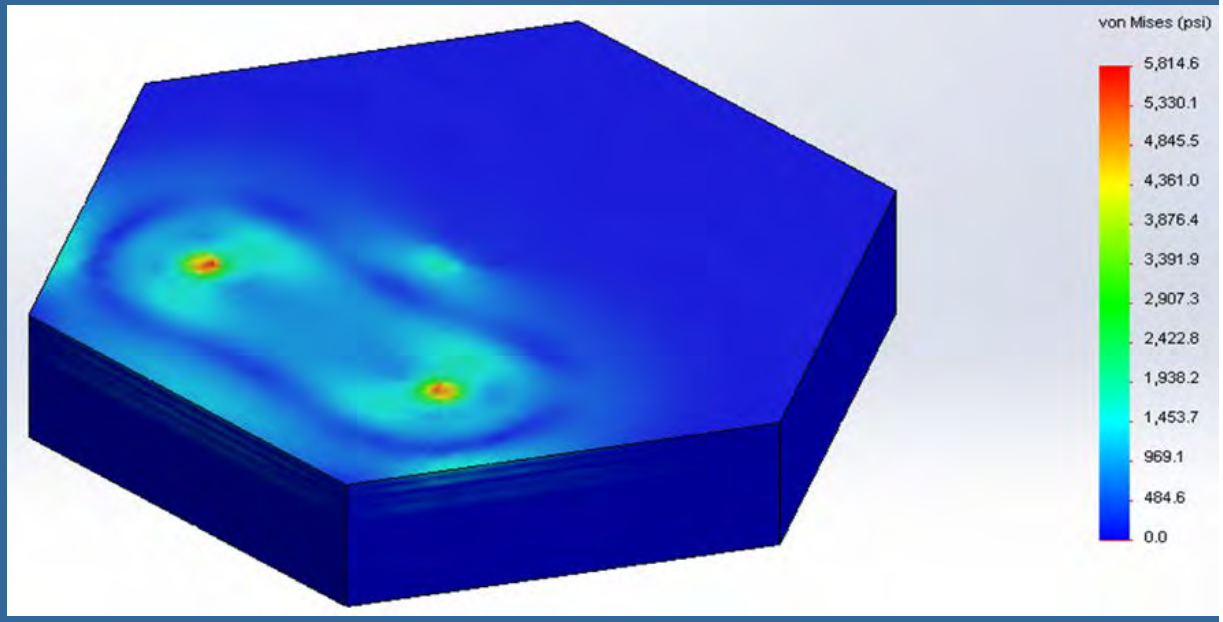
Transmissivity Testing

Glass surfaces tested for transmissivity and skid

Finite Element Analysis



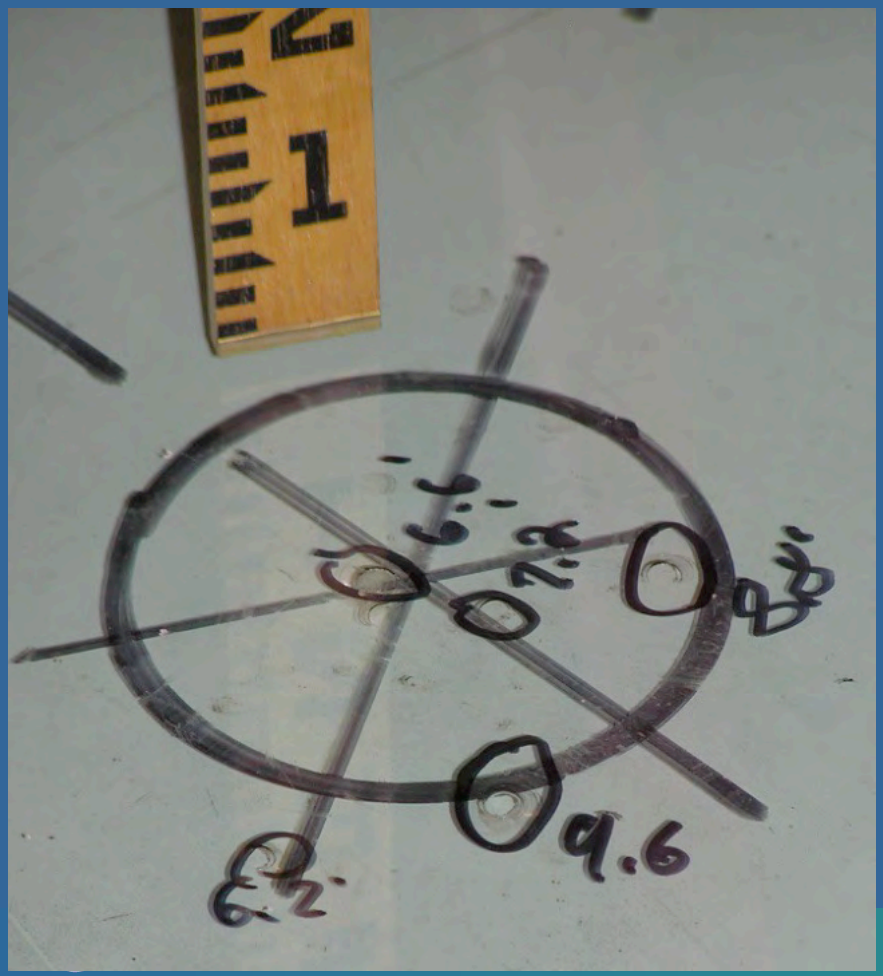
Mesh



Tire Loading

Impact Testing

Center

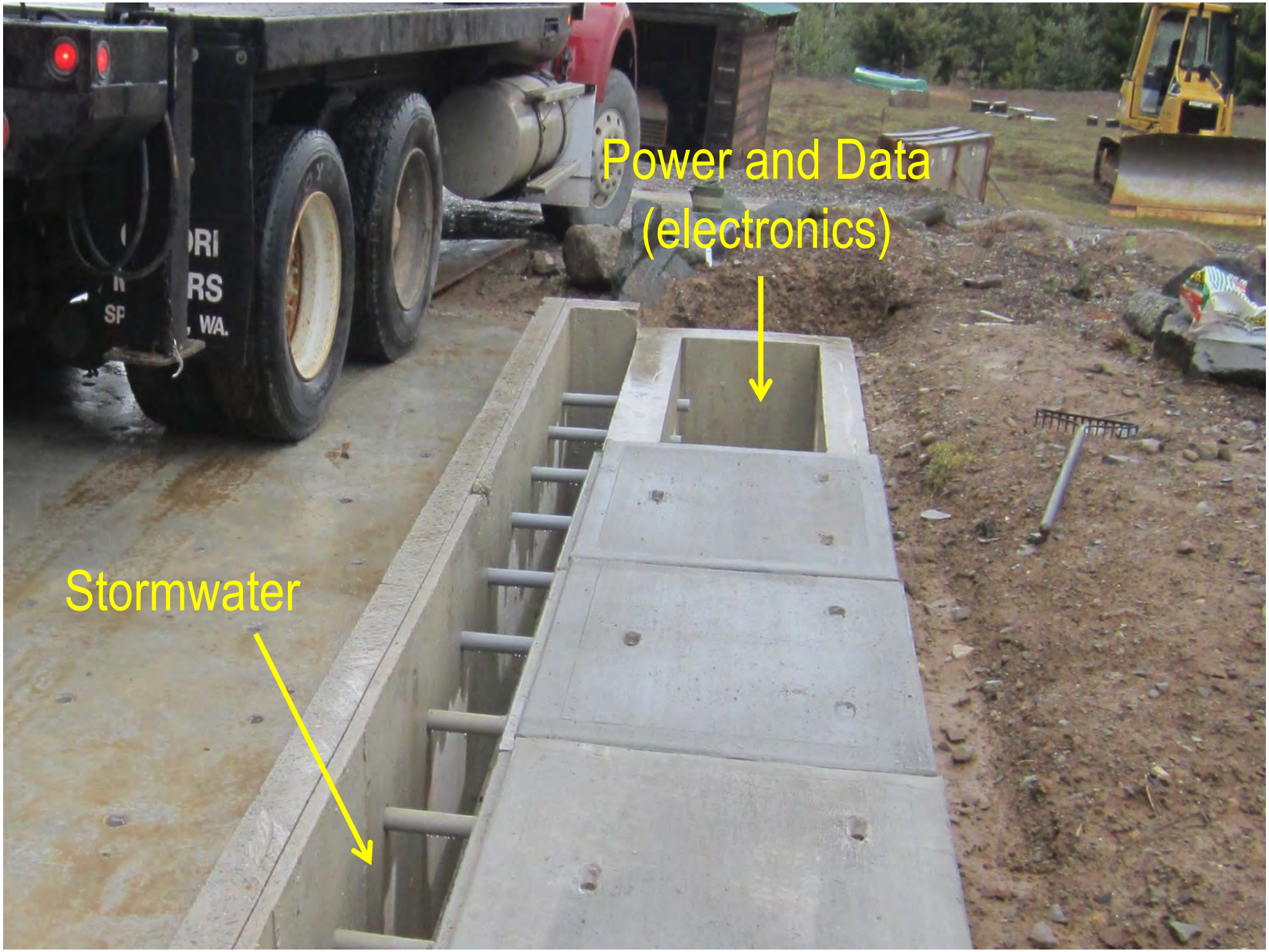


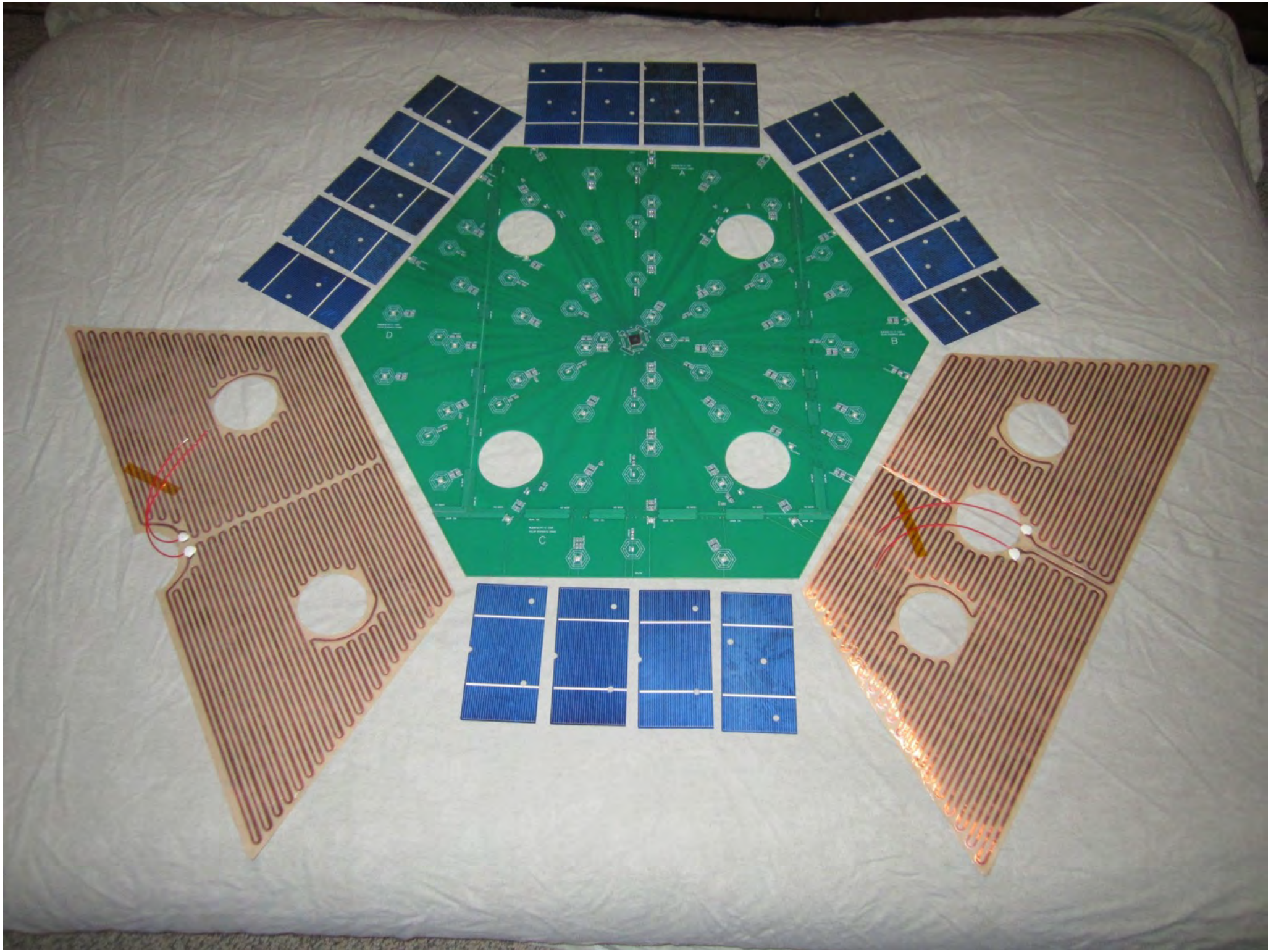
Edge

Load Testing

Before

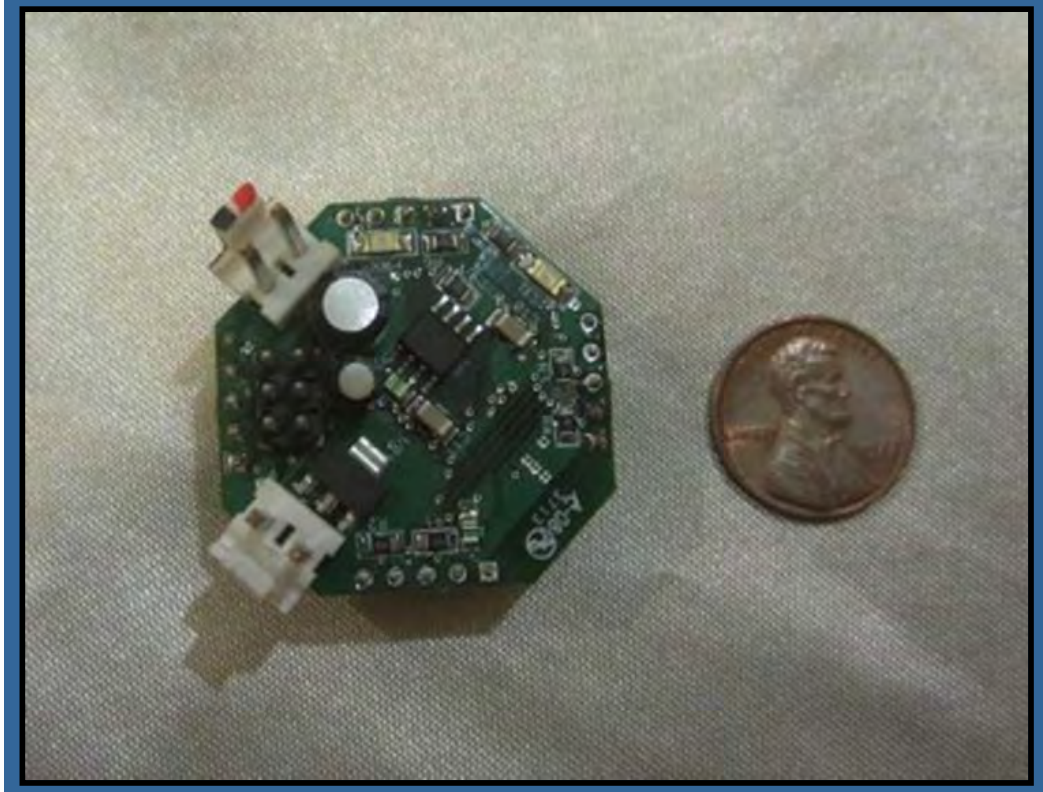
After


Power and Data
(electronics)
Stormwater

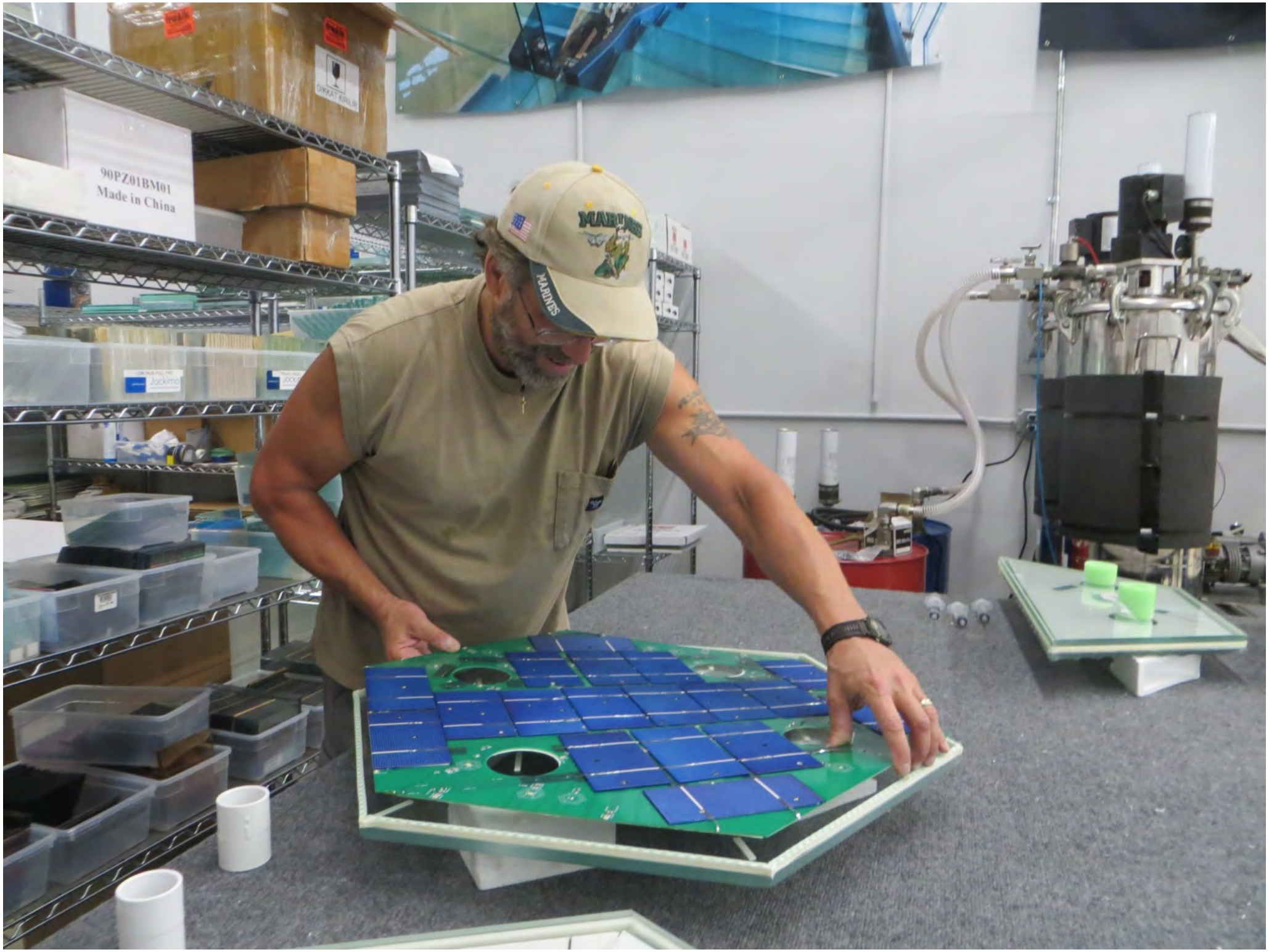


Electronic Control and Communication

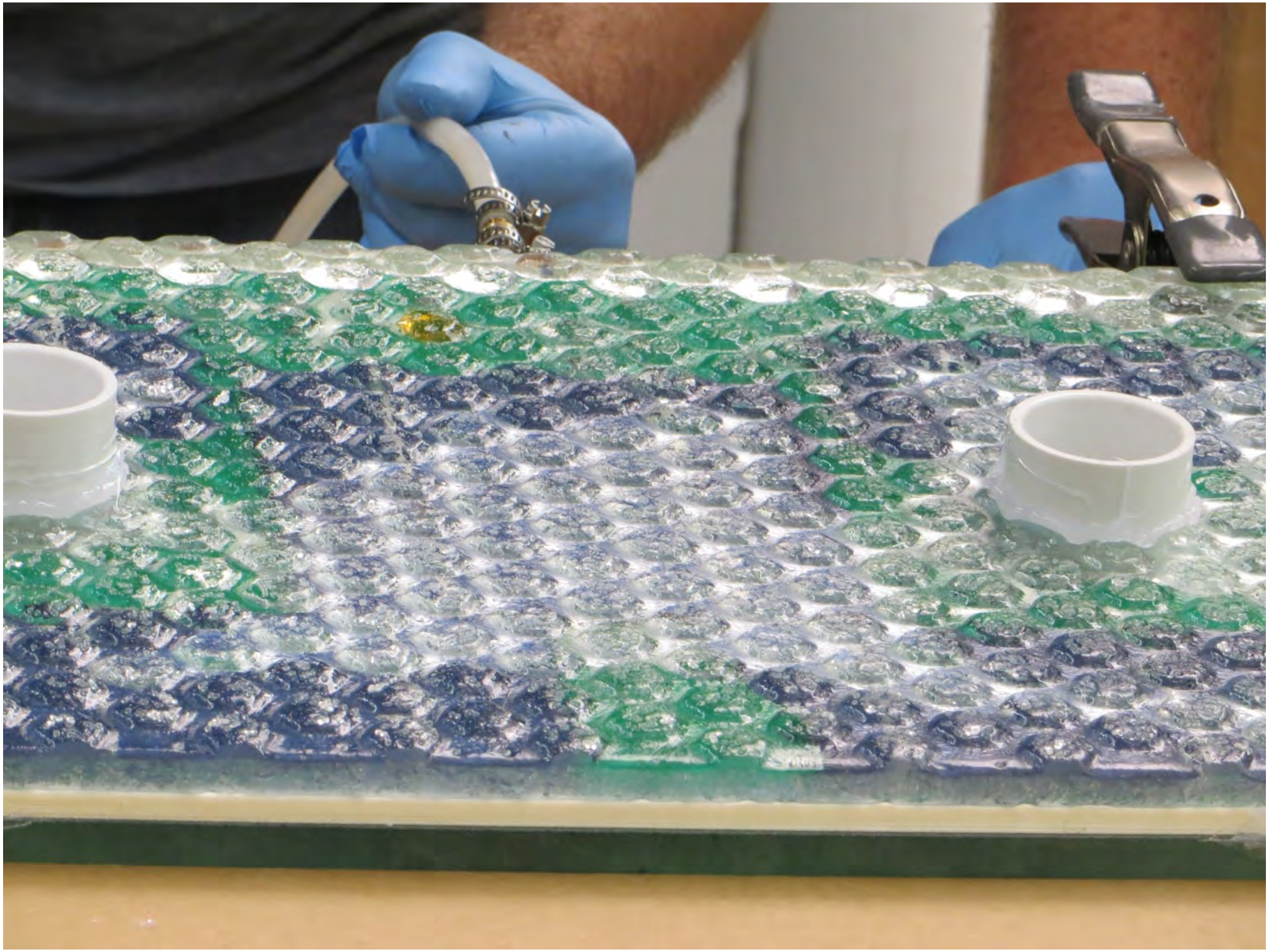
Microprocessor



Controller

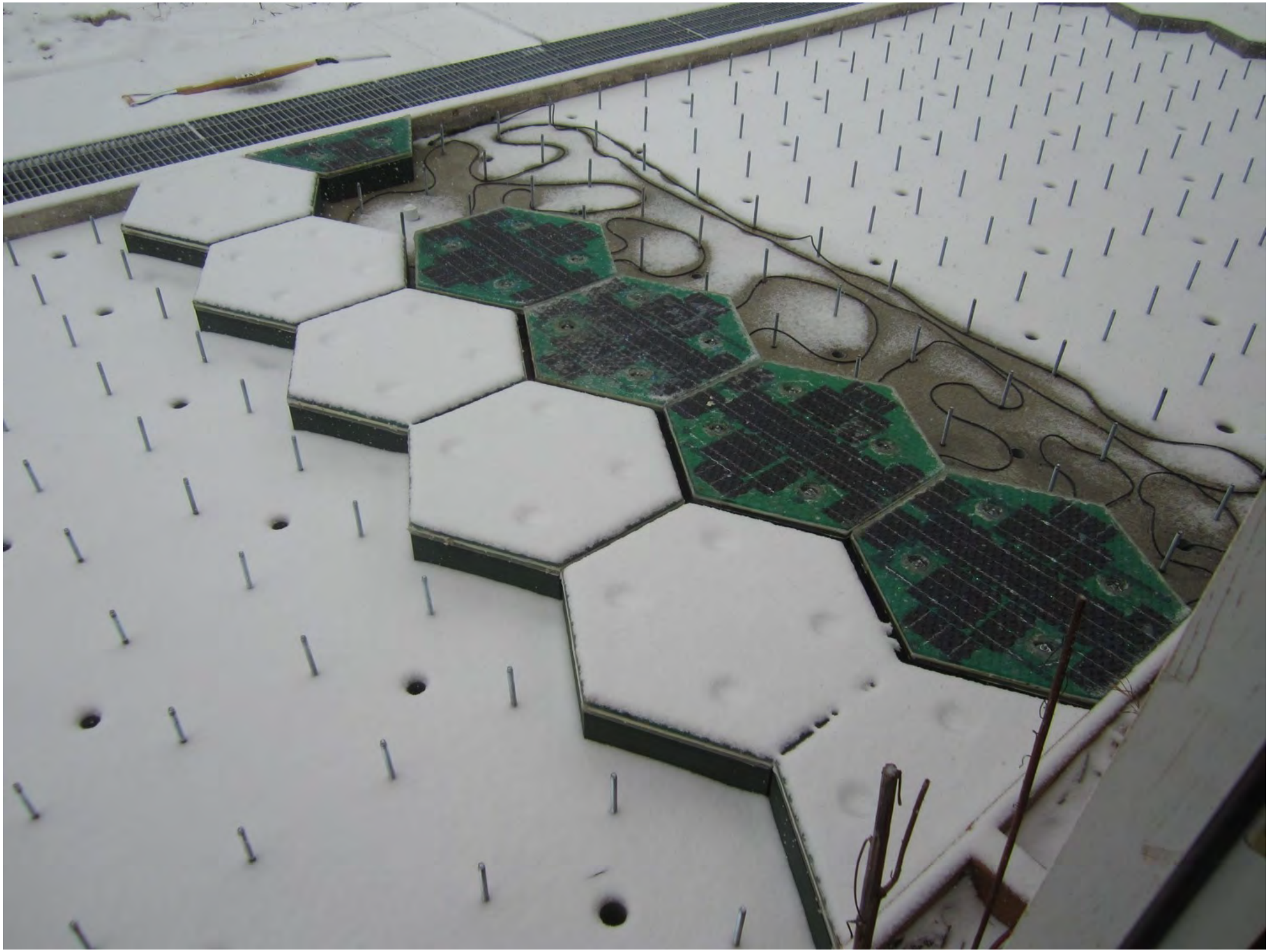

90PZ01BM01
Made in China
MARINES


ULINE
MARINES
90PZ01BM01
Made in China
Jockimo

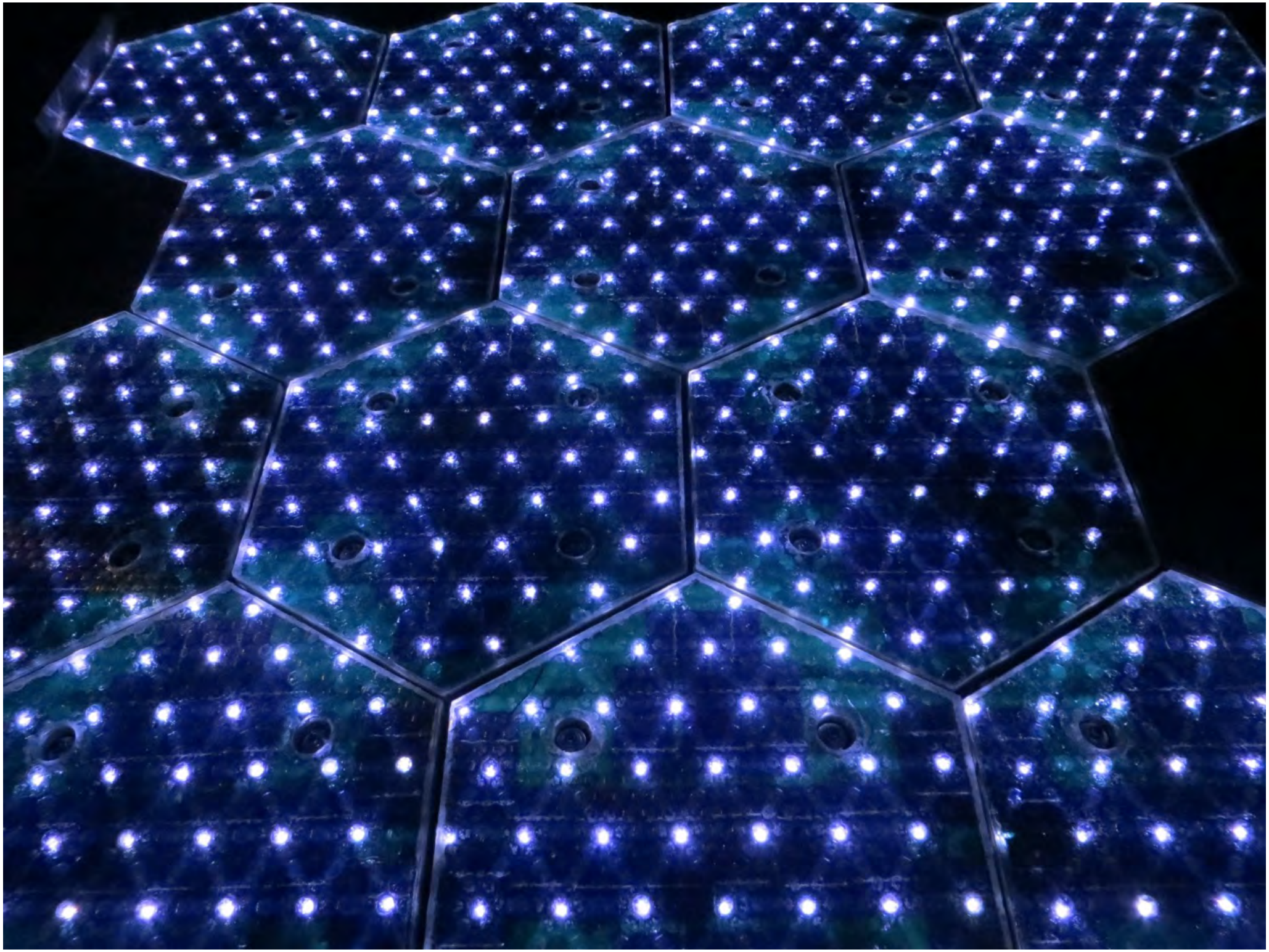



CAUTION
HEAVY
FRAGILE
HANDLE WITH CARE
DO NOT
ACCEPT IF
DAMAGED

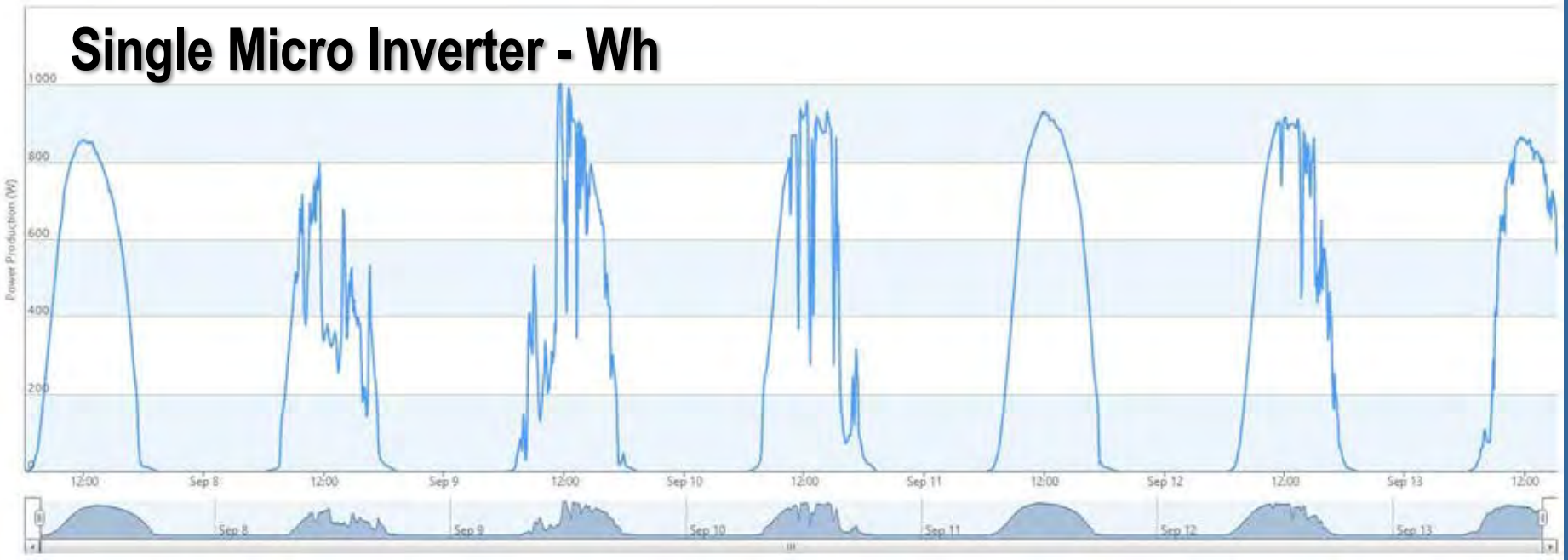

SUBARU



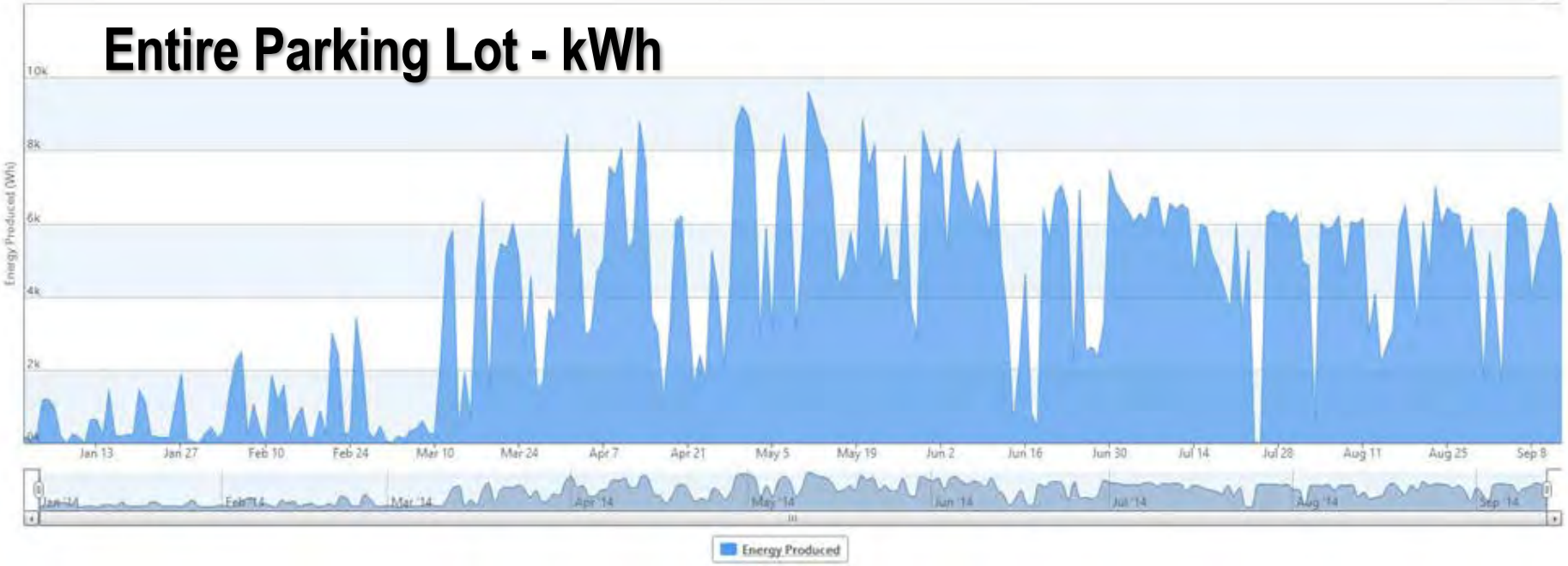

NFC
LED HEAD



Single Micro Inverter - Wh



Entire Parking Lot - kWh




JOHN DEERE

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Solar Roadways

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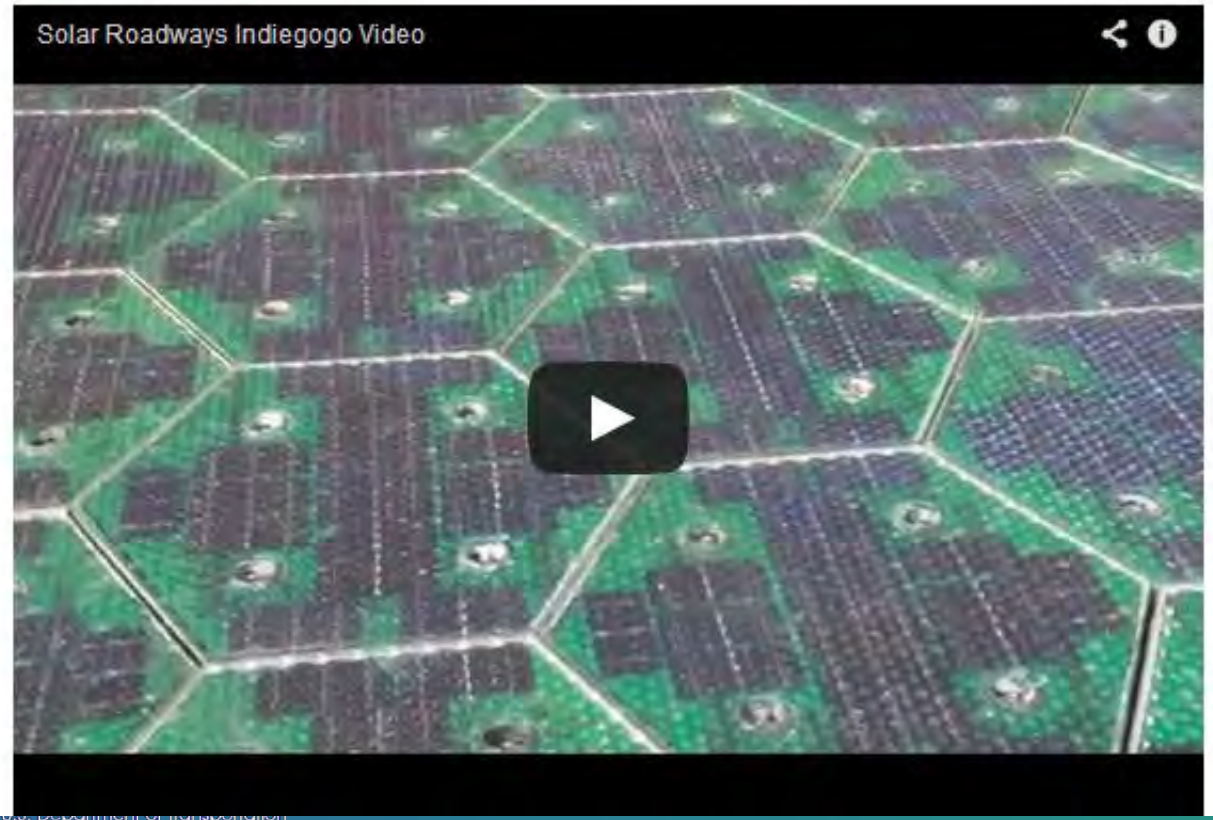

$2,200,716 USD
RAISED OF $1,000,000 GOAL

220% | 0 time left

Flexible Funding

CAMPAIGN CLOSED
This campaign ended on June 20, 2014

SELECT A PERK

SOLAR FREAKIN' ROADWAYS

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Sandpoint, Idaho

U.S. Department of Transportation
Federal Highway Administration

Existing concrete is cut

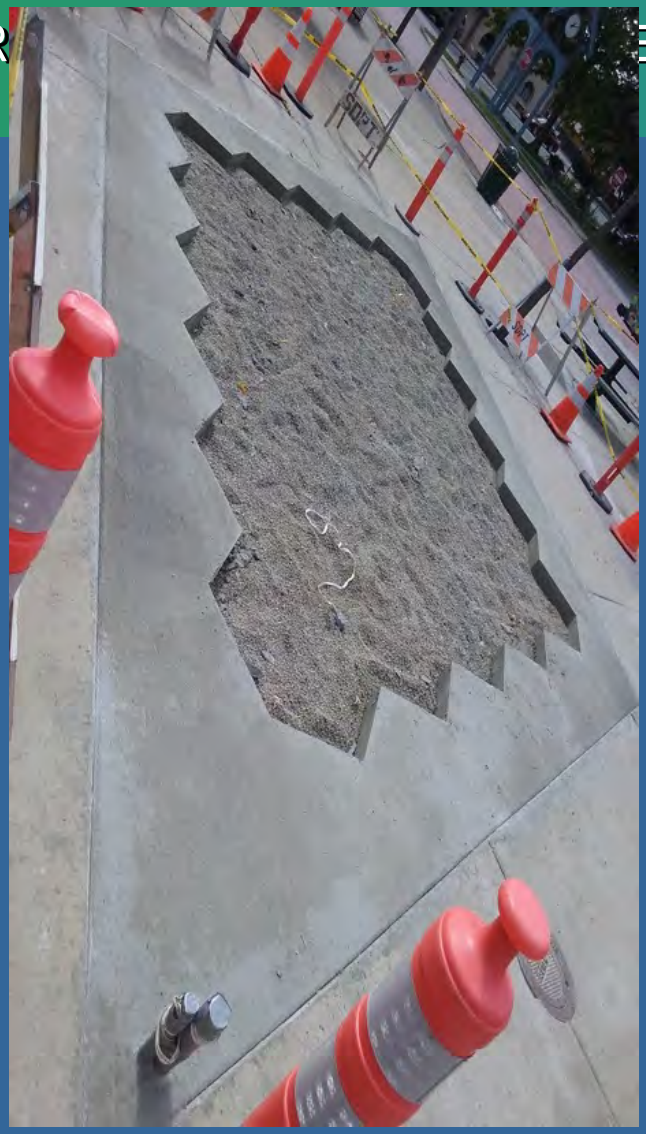
Drain system and conduit added

Forms built

Forms complete

Concrete poured

TUR EARCH CENTER



Dried concrete

Web Cam

Mayor of Sandpoint helping install aluminum retainer rails (perimeter only).

Leveling the sand base prior to compaction

Installing Typar over the sand

Installing panels. The high intensity flashlight is positioned over the internal light sensor, causing the LEDs to brighten.

Final test

Kids enjoying the pilot project

Webcam - http://www.cityofsandpoint.com/visiting-sandpoint/solar-roadways#ad-image-4

U.S. Department of Transportation
Federal Highway Administration

Amtrak Train Station Sandpoint

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Sandpoint Airport

U.S. Department of Transportation
Federal Highway Administration

Competition

SolaRoads - Netherlands

Wattway by Colas | Paving the way to tomorrow's energy - Mozilla Firefox

StayConnected @ Hilton | wattway - Yahoo Search... | Wattway by Colas | Pavi... | The idea - SolaRoad

www.wattwaybycolas.com/en/

solaroads

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wattway

CONCEPT | APPLICATIONS | COLAS

The concept

Related Concepts

Plastic Roads - Netherlands

SBIR Phase IIB

- Recommended for award July 2015
- $750k over 2 years
- Address the following objectives:
  - 3D FEM structural analysis and deflection testing…
  - Refine the manufacturing and production processes…
  - Demonstrate mechanical and structural performance with time…
  - Demonstrate electrical performance with time…
  - Perform life cycle assessment…
  - Produce design, construction, operation and maintenance guidelines
  - Guidance for coordinating with multiple relevant stakeholder entities