Quarterly Newsletter

BLUESHIFT

December 2022

CONTENT

Our Campus in Spencer, Massachussetts

A Busy Year for the Blueshift Team

Things changed fast in 2022 and we're excited to share all of it with you.

2022 was a busy one for the Blueshift team. The slowing of the pandemic allowed us to grow as leaders in the aerospace, defense, and electronic fields. Most exciting in 2022, our technology helped our customers achieve unrivaled growth.

Our reach was global this year. We attended 19 trade shows in four different countries and grew our customer base representing 15 countries.

We watched as our President (Tim Burbey) and VP of Technology (Dr. Garrett Poe) spoke as experts in our field, and we explored a number of promising new technology application proposals.

On the scientific homefront, our team unlocked thermal technologies, discovered new methods of testing, and grew our knowledge about the exceptional capabilities of our technology.

Our President
Tim Burbey

Our VP of Technology
Dr. Garrett Poe

We've become more active on social media in 2022. *Have you been following along?*

BlueshiftMatls

Blueshift-Materials

BlueshiftMatls

Blueshift Materials

New Additions

We added nine new members to our team in 2022. Check out a brief description of our new additions below.

Ron Williams

Joined: April 2022
Role: Business Development Specialist - Defense

Kendall Bush

Joined: May 2022
Role: Senior Product Manager Leader

Matthew Kay

Joined: June 2022
Role: Quality Assurance Technician

Becky Velie

Joined: July 2022
Role: Marketing Coordinator

Kerrie Anderson

Joined: September 2022
Role: Shipping and Recieving Specialist

Eric Gardner

Joined: October 2022
Role: Operator

Randy Kay

Joined: October 2022
Role: Operator

From Left to Right: Brian Brace, Garrett Poe, Kendall Bush

Timothy Kay

Joined: October 2022
Role: Operator

Darius Kittredge

Joined: October 2022
Role: Operator

Ron Williams

Blueshift is Hiring Too!

We're looking for excited and talented individuals to join our team. Interested? Us too.
Contact us today to apply.

Open Roles:

APPLICATIONS
- Applications Lab Technician
- Thermal Materials Engineer

SALES
- Business Development Represenative - Speciality Electronics

OPERATIONS
- Quality Manager

Upcoming Events in 2023

January 24th - 26th

IPC Apex Expo
San Diego, California

April 17th - 20th

Space Symposium
Colorado Springs, Colorado

May 1st - 3rd

Thermal Management Expo
Novi, Michigan

May 2nd - 4th

Space Tech Expo US
Long Beach, CA

May 9th - 11th

PCB East
Foxborough, Massachusetts

June 11th - 16th

IMS IEEE
San Diego, California

September 12th - 14th

DSEI
London, England

September 19th - 22nd

PCB West
Santa Clara, California

September 27th - 29th

NSMSS
Washington DC

We'll be traveling all over in 2023.
We'd love to see you - meet us at any of the above shows!

(888) 350-7586 | info@blueshiftmaterials.com | www.blueshiftmaterials.com

In Case You Missed It

Industry News: Aerospace

X-59 Credit: Composites World

Rocket Lab To Focus on National Security

December 1st, 2022
Originally Published in *Space News*

Rocket Lab, a company that offers launch services and manufactures space hardware, announced on December 1 that it will be creating a separate entity to cater specifically to U.S. defense and intelligence agencies.

By establishing a dedicated national security subsidiary, Rocket Lab aims to better understand the specific requirements of these customers, which may include "dedicated rapid call-up launch, satellite design, build and integration, spacecraft operations, or all of the above."

The new business sector, called Rocket Lab National Security, also will work with U.S. allies, the company said.

NASA's X-59 Plane to Break the Sound Barrier With No Sonic Boom

December 7th, 2022
Originally Published in AIAA

Just outside of Lancaster, California NASA is working on a new airplane designed to fly faster than the speed of sound yet produce only a "sonic thump".

The X-59 Quiet Supersonic Technology (QueSST) aircraft has been shaped to minimize sound waves that typically produce the well-known "sonic boom" phenomenon".

The Rise of eVTOL Aircraft

December 7th, 2022
Originally Published in *AIAA*

2022 witnessed the rise of many incredible aviation technologies. Of particular note is the rise of the electric vertical takeoff and landing aircraft industry.

A wide variety of design proposals pose great promise for achieving lofty urban air mobility goals. Many design concepts are in the flight testing phase including Germany's Volocopter's Volo Region aircraft and Lilium's Pheonix 2 aircraft.

The Volo Region aircraft combines a fixed-wing design with two propulsion fans and six electrically driven vertical lift rotors.

Lilium's Pheonix 2 aircraft completed main wing transition, demonstrating the ability to transition from hover to wingborne flight.

2023 is likely to see record growth in the eVTOL industry. Blueshift is excited to join the transition to more sustainable ways of traveling.

In Case You Missed It

Defense News

Northrop Grumman Unveils B-21 Nuclear Bomber

December 4th, 2022
Originally Published in *Reuters*

Northrop has introduced its new B-21 “Raider” jet, which is the first aircraft in a new fleet of long-range, stealth nuclear bombers for the United States Air Force.

The B-21, which has a similar “flying wing” design to the B-2, will be able to deliver both conventional and nuclear weapons to global destinations with its long-range and mid-air refueling capabilities. The United States Air Force plans to purchase at least 100 of the approximately $750 million B-21 planes and start replacing the B-1 and B-2 bombers with them.

Lockheed Martin and Israeli Contractor Rafael Teaming Up

December 6th, 2022
Originally Published in *Reuters*

Lockheed Martin and the Israeli Contractor Rafael are teaming up to create a high-energy laser weapon system. The two defense groups are attempting to develop a version of the “Iron Beam” that is geared towards US markets and its allies.

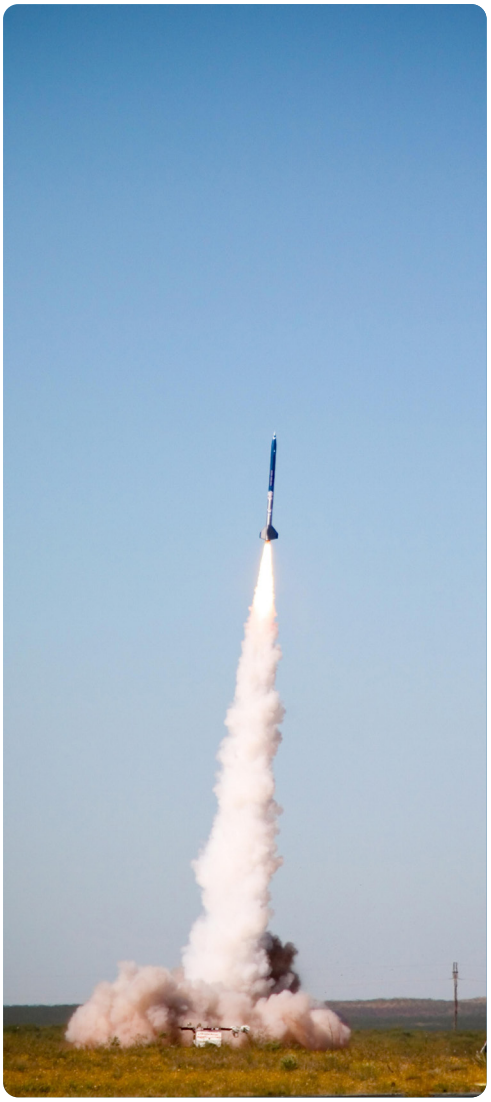
Iron Beam was successfully prototyped last year and seen as a cheaper alternative for neutralizing enemy missiles than the current “interceptor missiles” being used. The new technology relies upon lasers that super-heat and disable aerial threats.

U.S. Senate passes record $858 billion defense act, sending bill to Biden

December 15th, 2022
Originally Published in *Reuters*

On Thursday, the U.S. Senate approved a bill authorizing an all-time high of $858 billion in annual defense spending, $45 billion more than what President Joe Biden had suggested. The legislation also lifts the military’s requirement to receive the COVID vaccine.

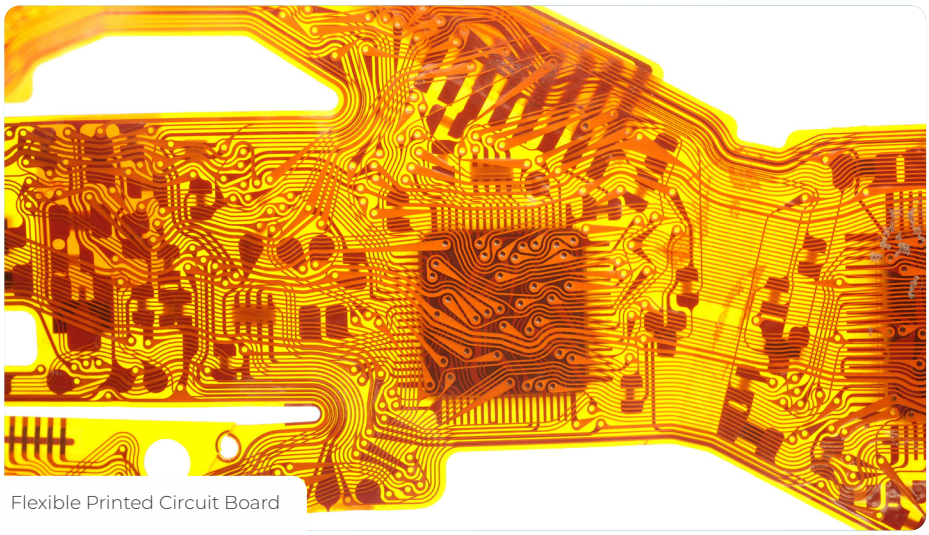
The National Defense Authorization Act (NDAA), an annual legislation that sets policy for the Pentagon and is a must-pass bill, was supported by an overwhelming 83-11 bipartisan majority of Senators. This includes a 4.6% pay increase for the troops, funding for the acquisition of weapons, ships, and aircraft, and support for Taiwan as it confronts aggression from China and for Ukraine as it combats an invasion by Russia.



Carbon Fiber Structure

In Case You Missed It

Electronics News



Flexible Printed Circuit Board

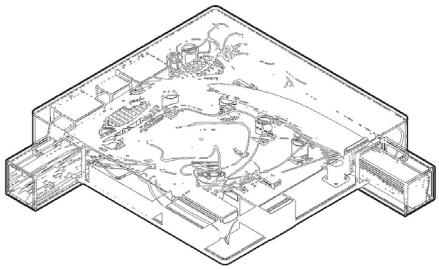
How Candy Could Change the Future of Semiconductors

November 25th, 2022
Originally Published in
Science Daily

A scientist at the National Institute of Standards and Technology, Gary Zabow, has stumbled upon a new method of depositing microchips on surfaces using a surprisingly sweet ingredient: table sugar.

Semiconductor chips require a process called microprinting in which intricate patterns of metals are applied to a range of substrates. Directly printing these patterns is difficult so scientists transfer prints, a process that *Science Daily* compares to the process of using putty to pick up newsprint. The method can prove difficult and sometimes unsafe (in the step akin to removing the putty from the print).

However, Zabow discovered a new, safer, method in which by dissolving sugar in a small amount of water it can be poured, hardened, and peeled away with the micropatterns still intact. The candy, with the print inlaid, is then placed on the desired substrate and melted - depositing the pattern on the surface.



Development of an Easy-To-Synthesize Self-Healing Gel

November 17th, 2022
Originally Published in
Science Daily

Self-healing polymeric materials are capable of repairing damaged areas, thus increasing the lifespan of materials. A newly developed ultrahigh material weight polymeric gel fits within circular economy principles and due to the non-volatile method in which the material is synthesized it is expected to be used as a safe ionically conductive soft material in flexible electronics.

IN OTHER HEADLINES

11/22

TEACHING PHOTONIC CHIPS TO LEARN

Development of an optical chip that can train machine learning hardware.
Science Daily

11/18

HOW '2D' MATERIALS EXPAND

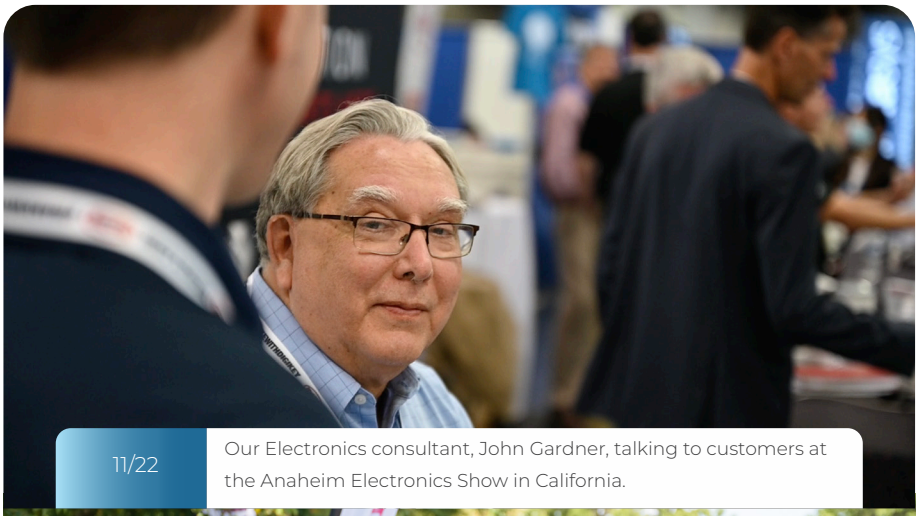
Development of a technique to measure the thermal expansion coefficient of 2D materials.
MIT News

12/9

NEW PAPER THIN SOLAR CELLS

Development of paper thin solar cells that can turn any surface into a power source.
Science Daily

Our Team in Action



11/22 Our Electronics consultant, John Gardner, talking to customers at the Anaheim Electronics Show in California.

08/22 Members of Our Team Attend the Urban Youth Raching School Grand Prix this summer in Philadelphia, Pennsylvania

10/22 Our summer intern, John Hoen, racing at the UYRS Grand Prix in Philadelphia this summer at our debut for RockeTape™.

Interview with Our President, Tim Burbey

Why did you start Blueshift?

Garrett Poe and I started Blueshift about 8 years ago really around the idea of light weighting, making products more energy efficient, and more resource efficient.

"We've put together a great team, and taken a very deliberate, diligent, and disciplined approach to technology."

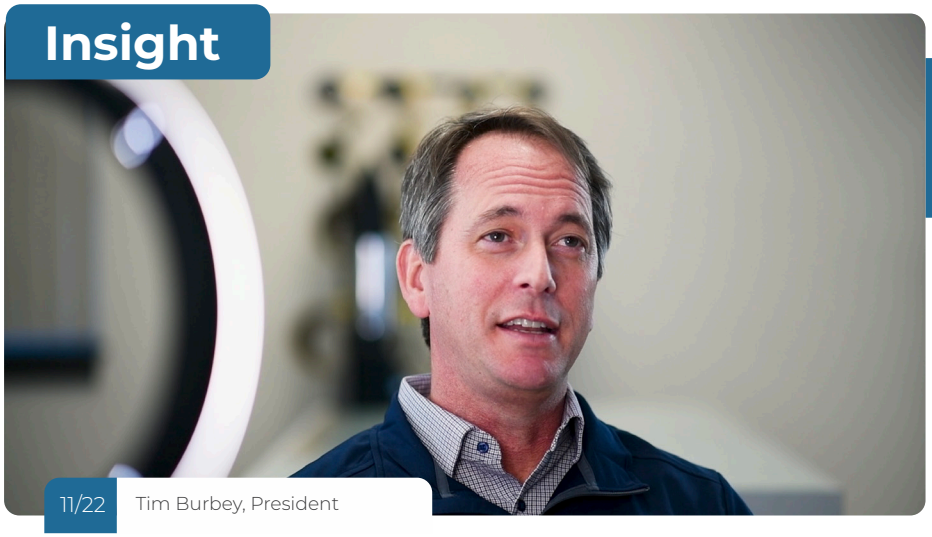
How has Blueshift evolved since it first began?

At the start, all we had was a great name, a good network of contacts in our markets, and a bunch of ideas. The first big milestone was licensing the rights to a process to make a polyimide aerogel. A very big hiccup in our journey was that the process that we licensed did not work. After a few years of dramatic failures, we had to develop all of our own IP. AeroZero was the first product we developed, which eventually evolved into our current offering of exceptional multi-layer thermal protection systems.

How did you develop the idea for your patented AeroZero® technology?

Oh, I didn't! We work with a lot of smart people, and it takes a lot of hard work. Listen, there's no getting around the amount of effort it takes to do something super innovative. We've put together a great team, and taken a very deliberate, diligent, and disciplined approach to technology.

Insight



11/22 Tim Burbey, President

Getting To Know Tim

What is a funny memory you have from the early stages of Blueshift that has made for a good story?

One of the first companies that was really interested in our material was a huge French oil & gas services company called Technip. They wanted to use our technology to insulate oil & gas pipelines in the North Sea. Our main contact, Sebastien, asked us what thickness we made. We said 10 mil. He said "great; 10 mils will work perfectly!" So, we sent samples and eagerly awaited the test results. Sebastien called with great surprise at how thin our material was..... He was thinking 10 millimeters not 10 mils . Ever since, we have been very careful to use microns when telling our international customers the thickness of our materials...

Have you always been interested in material science?

Interestingly, what got me into material science was international business. I was really always enthralled with different cultures. And I studied finance in school. I had to be an international banker. And I ended up getting into international trade based on material sciences. And so, it started from there and really grew to a love and understanding of how companies make products.

"It's really important to play the cards you're dealt the best you can, and you'll find a solution."

As someone whose background is not in science, what makes you excited about your technology?

I love the applications. Working with our customers in these crazy new projects. For example, we're working on electronic aircraft and also, we're involved with the space station for the moon. Its incredible to talk to these companies about their innovative use of technologies and get the chance to peer into the future market space.

What has surprised you about your journey so far?

The biggest surprise to me is where we are today in the markets. I would have never guessed that we'd be working with hypersonics and electronic aircraft, you know, protecting rockets as they ascend and descend. And that's really surprised me. Just the markets we've ended up playing in.

What are some of the biggest challenges you've faced with Blueshift so far?

Some of the biggest challenges are due to the difficulty what we're making. We've begun designing a product line in technologies that has never been commercialized before. So having to do everything in new equipment was an enormous challenge for us. There's great satisfaction in having been able to do that.

Where do you see Blueshift in 5 years?

I see Blueshift in five years as being a leader in material sciences for electronic aircraft battery protection. Also, we're going to play a really important part in making sure our defense technology is top notch as the country.

What is one important lesson you've learned since starting Blueshift?

There's always a move you can make so never feel stuck. You've always got options. Its really important to play the cards you're dealt the best you can, and you'll find a solution.

Watch the full interview at:

www.blueshiftmaterials.com