



TRGR

TECHNOLOGY READINESS
I N I T I A T I V E

PROGRESS REPORT

FISCAL YEAR

2023



20 PROJECTS

A Venn diagram with three overlapping circles. The top-left circle is light purple and contains the text '20 PROJECTS'. The bottom-left circle is dark purple and contains the text '15 LICENSES'. The right circle is medium purple and contains the text '3 CRADAS'. The background features a technical drawing of a dome structure with various lines and dimensions.

3 CRADAS

15 LICENSES

Activities since the
inception of the TRGR
Program in July of 2020.

CONTENTS

INTRODUCTION

Opening Remarks.....	2
Program Overview.....	4
Technology Readiness.....	7

COMPLETED PROJECTS

Breezy Robotics.....	8
Kairos Power.....	10
Management Sciences.....	12
mPower Technology.....	14
Pajarito Powder.....	16
QUASR Diagnostics.....	18
TPL.....	20

IN-PROGRESS PROJECTS

Advanced hCMOS Systems.....	22
Critical Materials.....	23
CSolPower.....	23
Molten Salt Solutions.....	24
Safe Station.....	25
Sigma Advanced Technologies.....	25
Westwind Computer Products.....	26

Program Metrics.....	27
Acknowledgments.....	28

Alicia J. Keyes
Cabinet Secretary

Economic Development
Department
State of New Mexico



“The TRGR Technology Readiness Initiative is off to a fast start, helping start -up businesses in New Mexico refine and scale their technologies so they advance more quickly toward commercialization, which creates jobs and builds wealth right here in New Mexico.”

“The TRGR Technology Readiness Initiative tax credit enables Sandia and Los Alamos national laboratories to help businesses in New Mexico perfect technologies for market. The credit is an investment that grows our high-tech sector and diversifies the New Mexico economy.”



Stephanie Schardin Clarke
Cabinet Secretary

Taxation and Revenue
Department
State of New Mexico

Dear Governor Lujan Grisham and New Mexico State Legislators,

We are pleased to present the 2023 progress report for the New Mexico TRGR Technology Readiness Initiative.

Since its inception in July 2020, the TRGR Program has already assisted 18 New Mexico companies with 20 TRGR Projects. Fifteen of these companies licensed technology from one of the two New Mexico national laboratories and three are engaged in a Cooperative Research and Development Agreement, also known as a CRADA, with Sandia or Los Alamos national laboratories.

We have helped these New Mexico companies with important tasks that are helping to move lab technology closer to market introduction. This is work that the New Mexico national laboratories are uniquely suited to do, and the labs are providing services that are not otherwise available in the private sector.

Transitioning lab technologies to market builds economic growth in our state. Companies that receive assistance with tasks like prototype development and technology validation are achieving milestones needed for investors to take notice and provide more capital. This means the company can move its product toward market introduction, and hire more people for high-paying jobs as the enterprise grows.

In this report, you'll read about a number of successful TRGR Projects, both those that are in progress and completed. You'll find out about the impact New Mexico companies are having in maturing their early stage technologies from the national laboratories. Here are two examples, one from each New Mexico national laboratory:

- Sandia helped develop a vital sensor for a reactor system. The company that received assistance has already made a \$50 million capital investment in New Mexico, hired 90 full-time employees, and has more growth planned.
- Los Alamos optimized a company's catalysts to work with different fuel cell manufacturers' designs. This led to additional investment from strategic partners, including Hyundai, and plans to expand its manufacturing facility and hire more people.

The TRGR Program helps make technology market ready. It is a needed tool to provide New Mexico businesses with access to the expertise and facilities available at New Mexico's national laboratories. The state of New Mexico, by supporting these technology transfer programs, gives our state's businesses a unique benefit that helps build New Mexico's economic ecosystem and create more jobs.

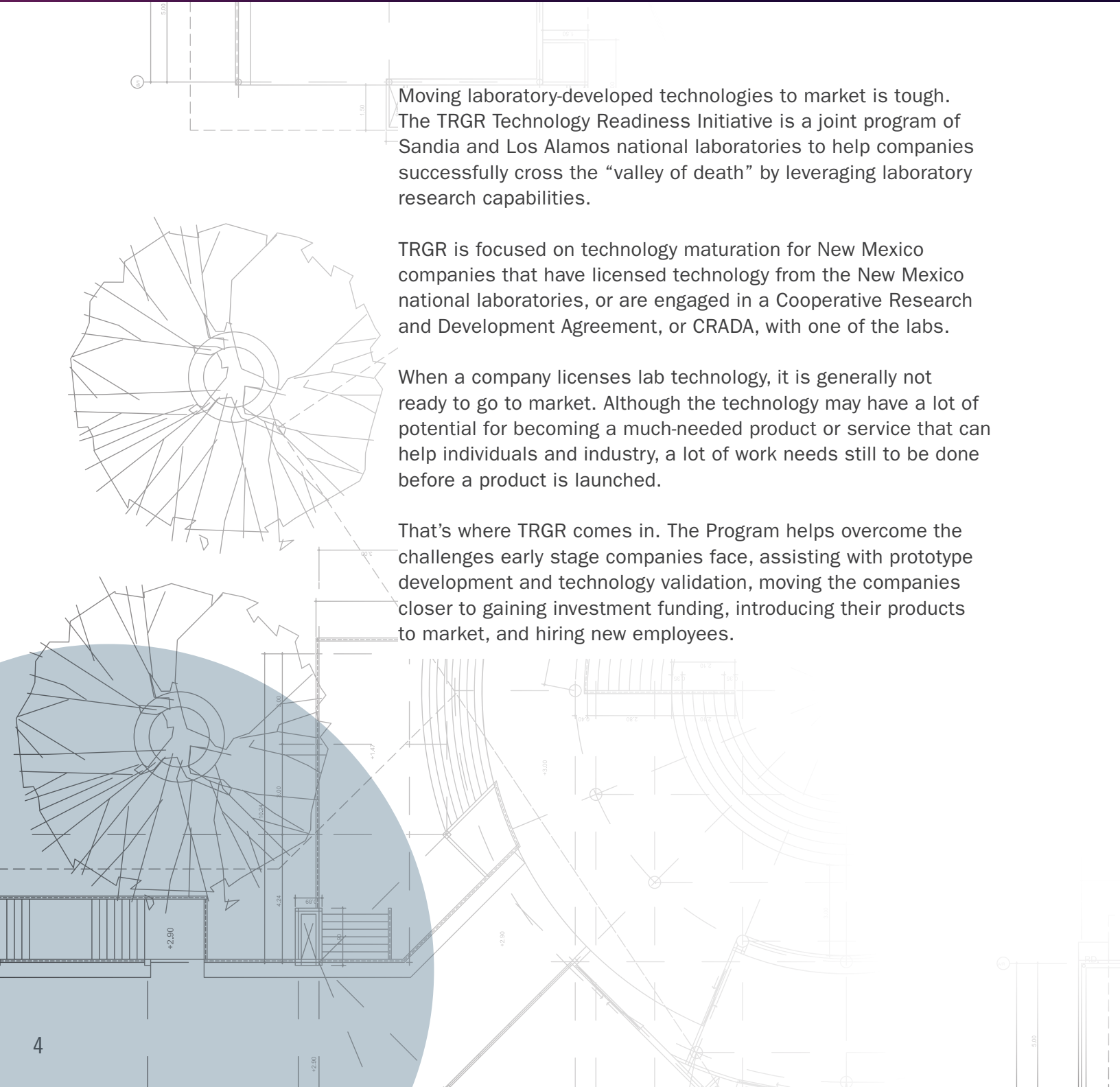


David Kistin
Sandia National Laboratories



Mariann Johnston
Los Alamos National Laboratory

PROGRAM OVERVIEW



Moving laboratory-developed technologies to market is tough. The TRGR Technology Readiness Initiative is a joint program of Sandia and Los Alamos national laboratories to help companies successfully cross the “valley of death” by leveraging laboratory research capabilities.

TRGR is focused on technology maturation for New Mexico companies that have licensed technology from the New Mexico national laboratories, or are engaged in a Cooperative Research and Development Agreement, or CRADA, with one of the labs.

When a company licenses lab technology, it is generally not ready to go to market. Although the technology may have a lot of potential for becoming a much-needed product or service that can help individuals and industry, a lot of work needs still to be done before a product is launched.

That's where TRGR comes in. The Program helps overcome the challenges early stage companies face, assisting with prototype development and technology validation, moving the companies closer to gaining investment funding, introducing their products to market, and hiring new employees.



ENABLES COMPANIES TO:

Jump-start product development with testing and evaluation

Validate and de-risk technology to increase investor interest

Access advanced demonstration services and prototyping for new product launch, market entry, and scaling for manufacturing purposes

With TRGR, eligible New Mexico businesses can work alongside a national laboratory researcher to advance their technology toward a commercialization milestone, with funding up to \$150,000 per year per company.

The TRGR selection process includes the TRGR Project Review Board, an independent committee comprising members from state agencies, industry, academia, and government laboratories. Appropriate industry and subject matter experts are brought in to review each potential TRGR Project. These experts work with staff from the New Mexico Economic Development Department to review proposals and ensure that the planned Project has a good chance of pushing the technology further on the path toward market introduction.



Advanced
& Intelligent
Manufacturing



Aerospace



Biosciences/
Biotechnology



Cyber
Security



Sustainable
& Renewable
(Green) Energy



Sustainable
Agriculture
& Water



TRGR FACTS

- TRGR was created in July 2020 by the two New Mexico national laboratories in partnership with the state of New Mexico.
- TRGR was designed to address the significant capital investment and research and development effort required to mature technology to a place where it is market ready.
- TRGR was developed to spur innovation, create and expand regional businesses, and increase economic wealth.
- TRGR is funded through the Technology Readiness Gross Receipts Tax credit.
- TRGR provides unique work not available in the private sector.
- TRGR funding for each laboratory is capped at \$1 million per year.

TECHNOLOGY READINESS

What is Technology Readiness?

Technology Readiness is a method of assessing the maturity of technologies. There are many steps required to take a product from the early stages of the development process to proof of concept, product demonstration, manufacturing, and distribution. The TRGR Technology Readiness Initiative helps New Mexico companies move their products from concept through market introduction.

Moving Toward Market Introduction and More Jobs

The efforts of TRGR have a ripple effect. Even what might seem like a small move, from a TRL of 2 to a TRL of 4, means that a company is now ready to attract the interest of investors and secure capital. With investment, the company can continue down the path toward manufacturing. This will result in a growing and successful company that can hire more and more people for high-paying jobs in New Mexico.

1

Basic Principles

2

Technology Concept

3

Proof-of-Concept Validation

4

Prototype & Modeling

5

Prototype Validation

6

Prototype Field Demonstration

7

Prototype in Commercial Conditions

8

Manufacturing Fully Tested and Validated

9

Product in Market

BREEZY ROBOTICS

Agreement Type: License



Chris Ziomek
CEO

“We continue to research and experiment with various disinfectant chemistries, and the more sustainable surfactant identified as part of this study is an important step forward.”

Chris Ziomek
CEO
Breezy Robotics Inc.

Breezy Robotics sources the right disinfectant for each job and finds an economical way to disperse the disinfectant using robots.

The company collaborated on a TRGR Project with Sandia National Laboratories scientists to produce a new concentrated disinfectant product. Based on a decontamination formula licensed from Sandia, the team worked on developing a disinfectant that only leaves benign residue after use. This formula could be used for routine application in high-traffic public spaces where surfaces must be spotless after cleaning.

The goal was to create a dry powdered product that could be mixed on site with hydrogen peroxide and water. This would reduce the cost of shipping and make the product viable for sales locally and internationally.

Quaternary ammonium compounds are used in many cleaning products as microbials and surfactants. The frequent use of disinfecting wipes containing QACs during the pandemic raised some concern about repeated exposure. This Project proved that the decontamination formula was viable without QACs.

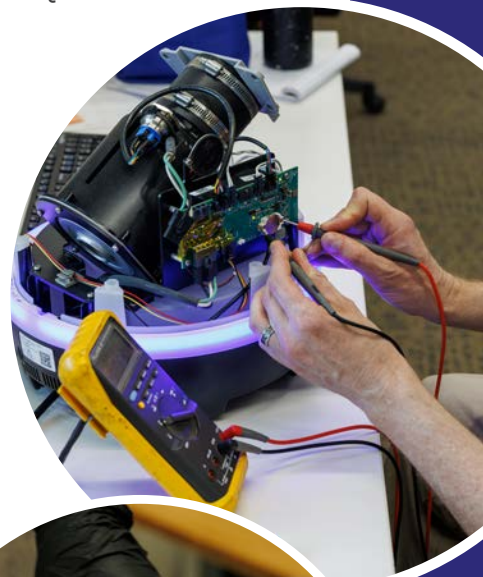
Although during the course of the TRGR Project they were unable to develop a completely residue-free product, the researchers continue to experiment with various disinfectant chemistries. A more sustainable surfactant identified as part of this study is a good step forward. In applications where residue can be rinsed easily, this technology, using food- and cosmetic-grade ingredients, could be used in its current form.



MEET THE PRINCIPAL INVESTIGATOR

Patrick Burton

Sandia National Laboratories



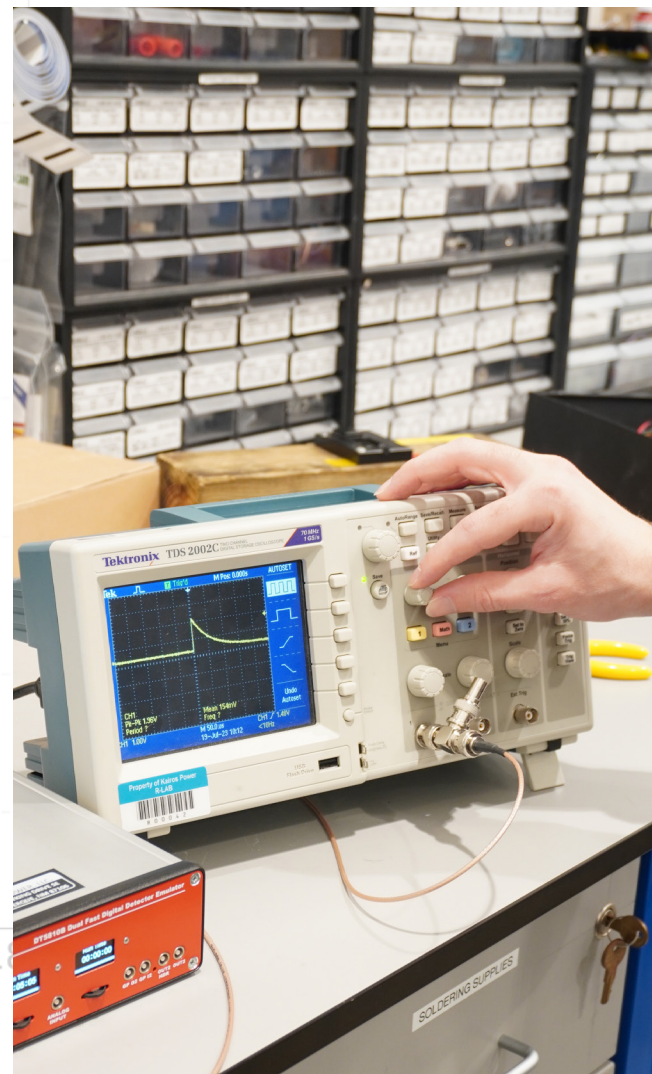


Gareth Whatcott
Manager, Engineering

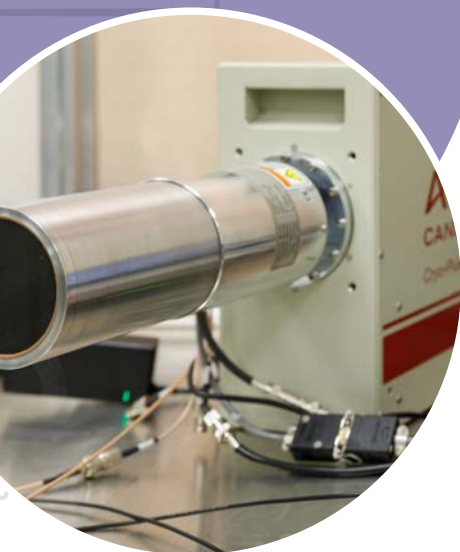
Ahmed Moustafa
Engineer III, Radiation Detection

“The Burn-up Measurement Sensor project has been an outstanding example of rapid iterative development in collaboration with a national lab to accelerate innovation for a critical system. The BUMS will be integral to enable online refueling for KP-FHR, and we are grateful to have the TRGR Program’s support in building it.”

Edward Blandford
Co-founder and Chief Technology Officer
Kairos Power LLC



600 800 1000 1200 1400 1600 1800
Energy (keV)



counts / channel (

10^{-4}

10^{-5}

10^{-6}

10^{-7}

10^{-8}

KAIROS POWER

Agreement Type: CRADA

Kairos Power is a nuclear energy engineering, design, and manufacturing company commercializing a fluoride salt-cooled high-temperature reactor (KP-FHR) with a mission to enable the world's transition to clean energy. The company's testing and manufacturing facility in Albuquerque will support the design, construction, and operation of the Hermes demonstration reactor in Oak Ridge, Tennessee.

Kairos Power is developing a Burn-up Measurement Sensor to analyze graphite fuel pebbles during operation, identifying how much fuel has been used and whether a pebble could be reused. Unlike a conventional reactor, KP-FHR allows fuel to be added and removed without shutting down, so burn-up measurements must be done quickly.

Through a TRGR Project, Sandia National Laboratories Scientist Sudeep Mitra employed the Labs' specialized equipment, including a high-speed digitizer and gamma-ray detector, with his expertise in gamma spectroscopy to support development of the BUMS. Instead of fuel pebbles, a detector emulator was programmed with the expected radioactive spectrum. These experiments yielded insights about what sensor types will work and which reaction byproducts to measure as markers for fuel consumption.

The BUMS is critical to taking risk off the table on the path to commercializing KP-FHR. Hermes, the first reactor to use the BUMS system, will be online by 2026.

Kairos Power has made an initial commitment to invest up to \$125 million in New Mexico to support its vertical integration strategy. To date, the company has made nearly \$50 million in capital investments and hired more than 90 full-time employees in Albuquerque with an average salary exceeding \$100,000.



MEET THE PRINCIPAL INVESTIGATOR

Sudeep Mitra
Sandia National Laboratories

MANAGEMENT SCIENCES

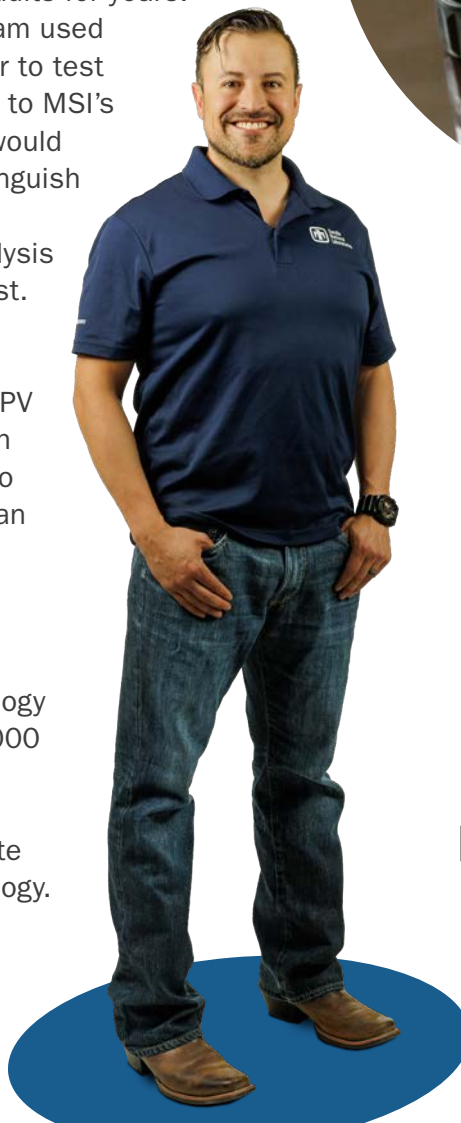
Agreement Type: License

Management Sciences develops sensors and safety equipment to minimize downtime of equipment. The company had already developed a photovoltaic connector that was designed to help prevent and extinguish arc-faults when it licensed a Sandia National Laboratories nano-ceramic layer by layer coating technology thinking it might help improve the performance of their connector.

As PV panels have become more efficient, they produce higher voltage, higher current, and higher power. But more electric current also means higher temperatures, which can lead to melting, the creation of voids in the plastic connectors, and arc-faults that can produce dangerous fires that put components, houses, and people at risk.

Sandia National Laboratories Scientist Ken Armijo has been involved with researching arc-faults for years. For this TRGR Project, he and his team used Sandia's patented arc-fault generator to test whether the licensed coating, added to MSI's arc-fault preventing PV connectors, would improve the ability to prevent or extinguish arc-faults. After testing the coated connectors, they did a scientific analysis to see which chemistries worked best.

The success of this TRGR Project to demonstrate that the risk of fires in PV connectors could be reduced through the use of the licensed coating led to MSI starting a new company, Guardian Devices, hiring two employees, and moving the technology closer to market. The company was awarded \$25,000 by New Mexico Economic Development in a Science & Technology Business Startup Grant, and \$900,000 by the Department of Energy Solar Energy Technologies Office Solar Manufacturing Incubator to accelerate the commercialization of the technology.



MEET THE PRINCIPAL INVESTIGATOR

Kenny Armijo

Sandia National Laboratories



Marlene (Kay) Blemel
President

Kenneth G. Blemel
Vice-President

Charmaine Tunell
Business Development Director

Kenny D. Blemel
Program Manager

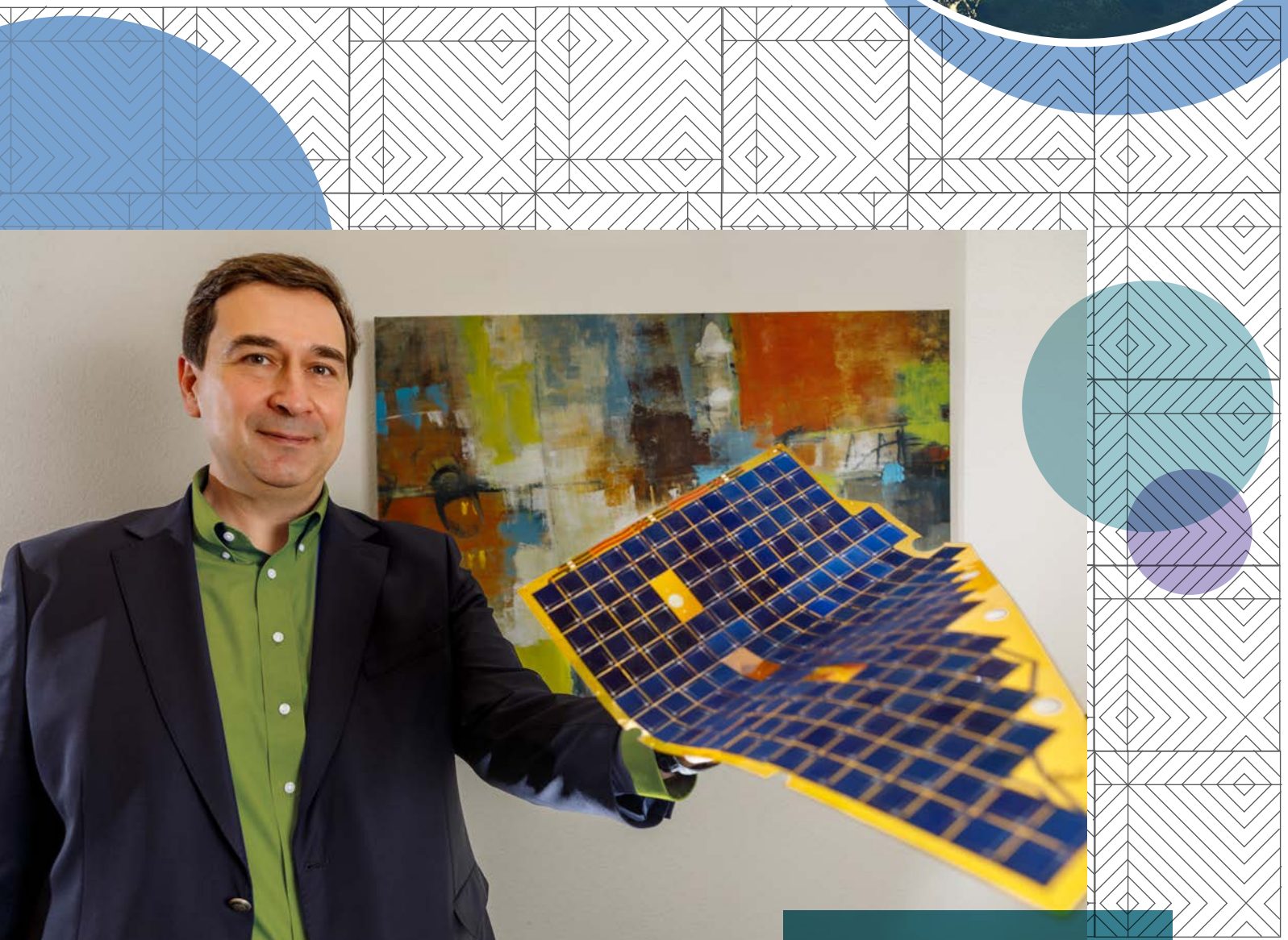
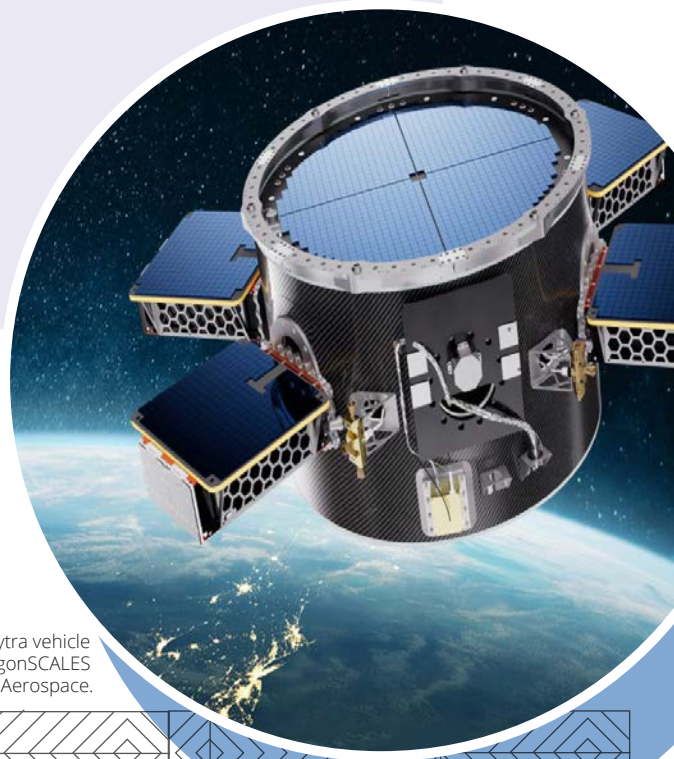
“Working with Sandia scientists Ken Armijo and Eric Spoerke through the TRGR Program provided technical equipment and experience needed for a positive outcome.”

Kenny Blemel
Program Manager
Management Sciences Inc.

“We were able to characterize and further understand the materials and designs used in our products with the help of the TRGR Projects, which are critical for our applications. This allowed us to gain further insights into our next generation of products and support the rapidly expanding needs of our customers in the space industry.”

Murat Okandan
CTO and Founder
mPower Technology Inc.

Image of Elytra vehicle
powered by DragonSCALES
courtesy of Firefly Aerospace.



Murat Okandan
CTO and Founder

mPOWER TECHNOLOGY

Agreement Type: License

mPower Technology is a solar cell and power company that licensed technology from Sandia National Laboratories to create their flexible, interconnected cells of highly efficient silicon that can be meshed into any shape. The company's DragonSCALES™ photovoltaic arrays can be used for multiple applications, with space and aerospace being the first markets that mPower has entered.

mPower's current products are already in use on low-Earth orbit satellites, and through two TRGR Projects, they have been able to make improvements and refinements to their next-generation solar technology that will support two large satellite constellations being planned by customers.

This second TRGR Project included making modifications and structural improvements to mPower solar cells. Scientist Josh Stein and his team at Sandia provided the expertise and equipment needed for thermomechanical modeling of solar array assemblies and measurement of advanced solar cell structures to support reliability, higher efficiency, and better performance.

As a result of the two TRGR Projects, mPower is in discussion with customers about ramping up production of its DragonSCALES PV arrays for low-Earth orbit satellite constellations that will be built over the next few years and will need replenishing in the future. mPower continues to work with customers including Honeybee Robotics Inc. on a lunar charging station for NASA, and Lynk Global Inc. on satellites. The company is also collaborating with a newer customer, Gravitics Inc., on a low-Earth orbit space station.



MEET THE PRINCIPAL INVESTIGATOR

Josh Stein

Sandia National Laboratories

PAJARITO POWDER

Agreement Type: License

Pajarito Powder manufactures catalysts for use with fuel cells and electrolyzers based on technology licensed from Los Alamos National Laboratory.

Semi trucks powered by hydrogen fuel cells are taking to the roads. Fuel cells make long-range driving possible and, unlike other types of electric trucks, there are no large, heavy batteries taking up precious cargo capacity. For fuel-cell trucks, the catalyst integrated into the fuel cell's membrane electrode assembly is 59% of the cost. So Pajarito Powder is working to manufacture more cost-effective and durable catalysts that ultimately will allow for better performing zero-emission vehicles that cost less.

This second TRGR Project with Los Alamos looked at integration, durability, and optimization. Work by Siddharth Komini Babu and his team (Kui Li, Xiaojing Wang, and Rod Borup) researched how to design catalysts with characteristics that can work with different fuel cell manufacturers' designs and operating conditions.

They ran benchmark tests pioneered at Los Alamos and analyzed the cells after testing. This provided data that can be used to modify catalysts for the next generation. It also provides a framework that customers and potential customers can use to integrate Pajarito Powder catalysts into their fuel cell systems.

The results of the two TRGR Projects helped the company advance their TRL from 4 to between 6 and 7, and secure additional investment from strategic partners Hyundai Motor Company and Bekaert of Belgium. This is allowing Pajarito Powder to expand its New Mexico manufacturing facility and hire 10 more people for high-paying jobs in the next 18 months.



MEET THE PRINCIPAL INVESTIGATOR

Siddharth Komini Babu

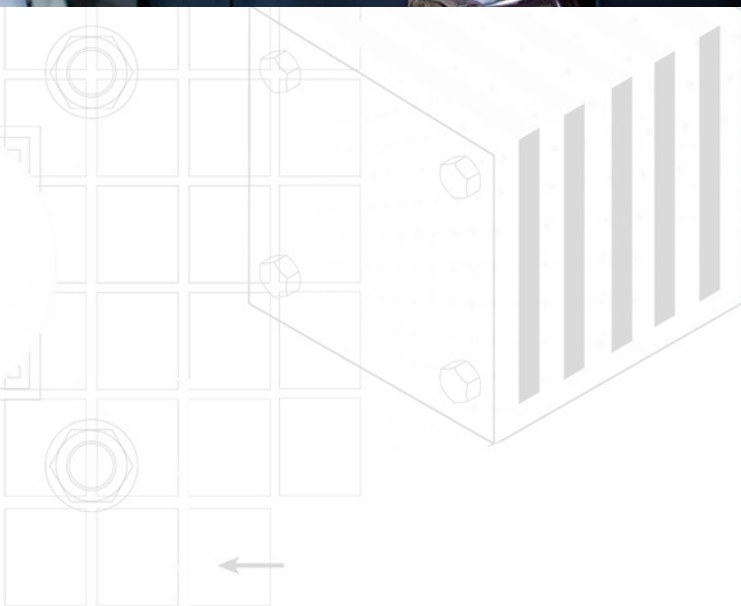
Los Alamos National Laboratory





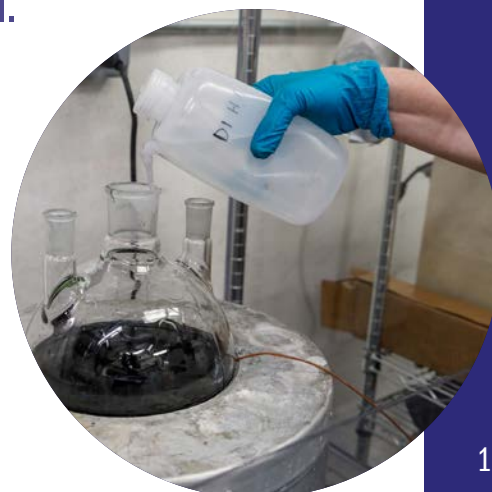
Thomas Stevenson
CEO and Chairman

Michele Ostraat
Chief Scientist



“This TRGR Project provided us with important insights for optimizing not only our catalyst design, but the structure of higher-level components that integrate our products. We are building upon these efforts to strengthen our relationships with customers and attract additional investment capital.”

Thomas Stephenson
CEO and Chairman
Pajarito Powder LLC





Vasu Kandachar
Senior Scientist



“TRGR and our partner Sandia were instrumental in developing our technology for commercialization, saving us about a year in research and development time. This is permitting us to go to market much sooner than anticipated.”

Maulik Shah
CEO
QUASR Diagnostics Inc.

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43

Cycle

QUASR DIAGNOSTICS

Agreement Type: License

QUASR Diagnostics licensed QUASR technology developed at Sandia National Laboratories to fulfill the founder's vision for disrupting the rapid diagnostics testing market. By amplifying the signals from an RT-LAMP (reverse-transcription loop mediated isothermal amplification) testing platform, QUASR makes the results brighter and easier to read.

QUASR technology allows for rapid pathogen testing either at home or in the field with the accuracy of laboratory-based methods. Colorimetric QUASR assays can be read using a cellphone camera and a proprietary app, providing direct consumer access to high level diagnostic testing.

In the TRGR Project, Sandia Scientist Bryan Carson worked with QUASR on assay design and validation, developing assays for influenza A and B. Extensive bioinformatic sequence analysis was utilized to develop assays that would work against all clinically prevalent variants of influenza A after analyzing thousands of viral genomes during the Project.

So far, QUASR has developed and validated assays for West Nile Virus, chikungunya, monkeypox and COVID-19. These assays are ready for commercialization and use on existing third-party instruments. The company is also in the final stages of developing its colorimetric detection app, and has submitted SBIR (Small Business Innovation Research) grants for pathogens such as hantavirus and dengue virus.

QUASR technology is currently at TRL 5 for developed assays on existing instrumentation and TRL 4 for at-home and in-field use assays. QUASR was selected for the Startup Showcase at the BIO International Convention, and is seeking Series A investment for test portfolio expansion, platform development, and assay manufacturing.

MEET THE PRINCIPAL INVESTIGATOR

Bryan Carson

Sandia National Laboratories



Agreement Type: CRADA

TPL develops advanced dielectric materials including polymeric films, and ceramic nanopowders and capacitors. Ceramic capacitors, because of their ability to handle very high voltages, are widely used in pulse power applications. This is a market of great interest to TPL and the company is evaluating both materials and design of these capacitors for a variety of applications.

One of the deficiencies of ceramic capacitors is that they can fail catastrophically, with such failures capable of generating major damage. Currently, there is no non-destructive testing technique capable of identifying failure location and, more importantly, providing a precursor warning of failure.

In this TRGR Project, scientists at the Electrical and Radiation Sciences Center at Sandia National Laboratories applied a radio frequency method originally developed to support lightning strike investigations. They worked to ascertain, through the use of RF detection sensors and triangulation techniques, whether RF measurements could be made to serve as a potential NDT technique for ceramic capacitors.

The results of this exploratory development work are extremely promising. The RF/triangulation technique proved extremely reliable in accurately identifying failure location, including a buildup in RF signal magnitude preceding failure. This precursor signal, generated during voltage buildup, has the potential to serve as a screening mechanism assessing capacitor performance. Sandia is continuing to mature this RF NDT technique and is looking forward to continued partnership with TPL.



MEET THE PROJECT MANAGER

Steven Glover

Sandia National Laboratories

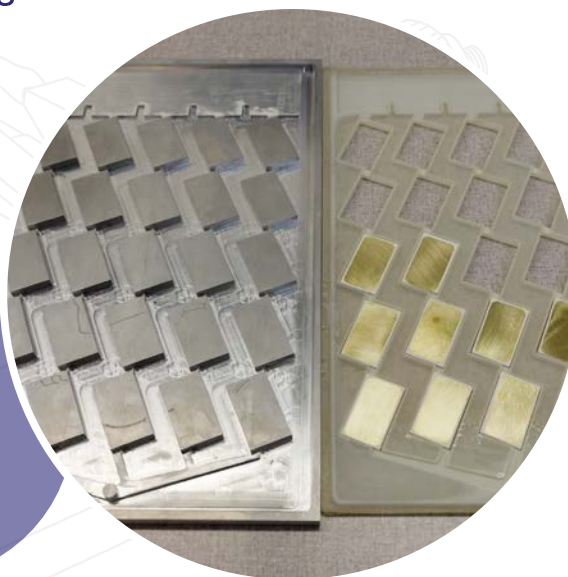


Kirk Slenes
CTO

Hap Stoller
President and CEO

“The results of the feasibility investigation into the use of RF signals as a non-destructive technique for ceramic capacitors is encouraging. We hope to advance this capability in future programs.”

Hap Stoller
President and CEO
TPL Inc.




IN-PROGRESS PROJECTS

TRGR applications are accepted and projects are started on a rolling basis throughout the year. Sandia and Los Alamos national laboratories scientists and engineers are now working with companies on the following projects. Funding for each project cannot exceed \$150,000 per project per state of New Mexico fiscal year.

ADVANCED hCMOS SYSTEMS

Agreement Type: License



Advanced hCMOS Systems LLC services government facilities performing high energy density physics and inertial confinement fusion physics experiments. These facilities make use of the nanosecond shutter, burst-mode, hybrid-CMOS imager technology AHS licensed from Sandia. HEDP/ICF experiments and applications are typically very bright, so current hCMOS imagers can capture images without amplification of the detected signal. However, there are also many low-light commercial markets that an hCMOS sensor with a low-gain (amplified) detector could enter. The TRGR Program is allowing AHS to utilize Sandia expertise to study the efficacy of using a low-gain avalanche diode to amplify the detected signal. Incorporating an LGAD device onto an hCMOS imager could disrupt the existing low-light imaging market by providing a less expensive, higher performance sensor than what currently exists in the market.



CRITICAL MATERIALS

Agreement Type: License

Critical Materials LLC is commercializing Sandia technology that utilizes CO₂, water, and an environmentally friendly complexing agent to efficiently mine strategic metals, including rare earth elements, from coal ash waste. This will help minimize the reliance on foreign sources of REEs, which are essential to the green energy and electronics industries, as well as our nation's defense. It will also lessen the environmental impacts of fly ash impoundments in New Mexico and across the U.S. Sandia scientists are partnering with the company's staff to optimize the technology, minimizing extraction time and water usage. They are also scaling the technology from the level of grams to kilograms and to a TRL of 5 so they can design a pilot-scale demonstration, moving the technology closer to market adoption.



CSolPower

Agreement Type: CRADA

CSolPower LLC is developing low-cost thermal energy storage systems that can be used for the growing amount of intermittent renewable energy sources on the electric grid, and for other applications. The company is working collaboratively with Sandia on a TRGR Project to construct and test a gravel bed and air system that can provide effective off-grid heat for greenhouses, hot water, and cooking. This will provide a demonstration of the company's concept, now almost ready for commercialization at TRL 6, which can be marketed. Next, the technology can be transitioned to larger projects such as heating a campus or city, and grid storage. The results of the TRGR Project will build CSolPower's credibility and increase investor confidence in this technology, which holds promise to be more economical than batteries for long duration energy storage.



MOLTEN SALT SOLUTIONS

Agreement Type: License



Molten Salt Solutions LLC is developing advanced materials that will be needed by the next generations of nuclear power technologies. Next-generation molten salt reactors will require metric tons of lithium-7 or chlorine-37 salts. Fusion reactors will also require large quantities of materials. The company is partnering with Los Alamos to develop environmentally-friendly, scalable methods for stable isotope enrichment using technology licensed from Los Alamos and the company's own intellectual property. Molten Salt and Los Alamos scientists are moving through proof-of-concept and validating the system in a production environment. The results of this TRGR Project will be a method for stable lithium-7 isotope enrichment that can be implemented at industrial scale and that will advance the TRL from 2-3 to 5-6.

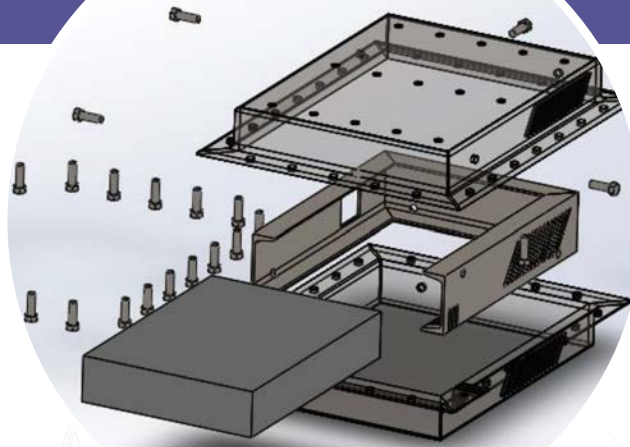
Molten Salt will use the results to evaluate the economics of commercial production to meet the needs of these emerging markets with prospective investors and strategic partners.



SAFE STATION

Agreement Type: License

Safe Station LLC is building a physical cybersecurity device using breach sensors licensed from Sandia. Recent regulations covering physical cybersecurity for federal nonclassified contractors create demand in that market, which is why it's the first the company will enter, followed by the federal classified market and the public sector, such as school districts. Safe Station's TRGR Project will ideally move the TRL of the device from 4 to 8 or 9, as a production prototype is developed, including a manufacturing, assembly, and procedures report, with a cost estimate/breakdown that will pave the way for an initial small-scale manufacturing run. The prototype will also undergo attack testing at Sandia, resulting in a third-party report including data that will be vitally important for investors and customers.



SIGMA ADVANCED TECHNOLOGIES

Agreement Type: License

Sigma Advanced Technologies LLC is a commercial provider for large water treatment systems and keen on developing next-generation water treatment solutions. The company is now using its proven treatment methods and remediation know-how in combination with licensed Sandia technologies, to remediate Polyfluorinated-Alkyl-Substances. PFAS are used to make a variety of products from cookware to stain- and water-resistant materials and foams used in firefighting. They are known as "forever chemicals" because they don't break down in the environment and are potentially hazardous to human health. In this TRGR Project, the team is focused on developing an efficient and low-cost solution to permanently remove these forever chemicals from drinking water, groundwater, and soils. Currently, the technology is at a TRL 2–3, with an anticipated TRL 4–5 at the Project's conclusion.



WESTWIND COMPUTER PRODUCTS

Agreement Type: License



Westwind Computer Products Inc. specializes in advanced manufacturing of alloys and plastics, and is currently partnering with Sandia in the area of refractory high-entropy alloys.

RHEAs are high-temperature, high-strength materials that exceed the performance of superalloys such as Inconels and high-grade stainless steels, making them ideal for high-temperature applications such as energy (e.g., nuclear reactors) and aerospace. For this TRGR Project, the binder jetting additive manufacturing process is extended—BJG has been used to manufacture high-quality stainless steel and Inconel components, but not RHEAs. The current BJG-RHEA TRL is 3.5 and will reach 6 by Project completion. The deliverables include a diffuser for a high-efficiency energy cycle and a surface for hypersonic vehicles.



PROGRAM METRICS

BUSINESSES PARTICIPATING IN TRGR

	 SANDIA	 LOS ALAMOS	TOTAL
FY23			
Licenses	9	2	11
CRADAs	3	0	3
FY21 - FY23*			
Licenses	12	3	15
CRADAs	3	0	3

NUMBER OF PROJECTS

FY23	12	2	14
FY21 - FY23*	16	4	20

NUMBER OF BUSINESSES**

FY21 - FY23	15	3	18
--------------------	----	---	----

VALUE OF ASSISTANCE PROVIDED

FY23	\$596,519.22	\$92,299.55	\$688,818.77
FY21 - FY23*	\$1,207,427.51	\$263,256.03	\$1,470,683.54

*TRGR Projects start at various times during the year so they may be active during multiple fiscal years.

**Two businesses have participated in more than one TRGR Project.

CUMULATIVE ECONOMIC IMPACT*

BUSINESSES PARTICIPATING IN TRGR

TRGR is accountable to the state of New Mexico for its expenditures. It measures its economic impact through client surveys conducted by Research & Polling Inc. and economic analysis provided by Robert Grassberger, PhD Economist.

	FY21 - FY23
Return on Investment (ROI) **	0.15
Small Business Jobs Created & Retained	17
Increase in Revenue	\$1,510,000
Investment in NM Goods/Services	\$308,000
New Funding/Financing Received	\$20,103,465
Average Reported Salary (2023)	\$64,250

* Economic surveys are performed six months to one year after project completion. It should also be noted that TRGR Projects are intended to mature technology and move it to a commercial state.

** ROI is based on salaries of jobs created and retained. Because TRGR Projects are in a very early stage of development, the ROI to the companies may not be truly reflected in these values.



BENEFITS TO TRGR BUSINESSES

New Mexico businesses achieved positive results after receiving technical assistance from the TRGR Program. Feedback from companies that participated in the economic impact client survey revealed that:

63% were able to move the technology closer to maturation.

ONE COMPANY was able to scale/move from a prototype to a commercial product/service and has been able to market/manufacture the product/service.

FOUR COMPANIES experienced other economic benefits due to the assistance.

100% remain located in New Mexico.

CUSTOMER SATISFACTION

Quality of TRGR Services	4
Satisfaction with Project Manager	4.5
Satisfaction with Technical Staff	4.5
Effect of TRGR Assistance on Company	4
Would Recommend TRGR Program	4.5

Customer Satisfaction was rated on a scale of 1-5, with 5 being best.

Thank you to everyone who took part
in the TRGR Project Review Board:

<i>James Carney</i>	<i>Sandia National Laboratories</i>
<i>Jon Clark</i>	<i>New Mexico Economic Development Department</i>
<i>Alex Greenberg</i>	<i>New Mexico Economic Development Department</i>
<i>Jan Hickey</i>	<i>VA-CSP Clinical Research Pharmacy Coordinating Center</i>
<i>Srinivas Iyer</i>	<i>Los Alamos National Laboratory</i>
<i>Jessica Zofie Kubicek-Sutherland</i>	<i>Los Alamos National Laboratory</i>
<i>Topher Matthews</i>	<i>Los Alamos National Laboratory</i>
<i>Duncan McBranch</i>	<i>Los Alamos National Laboratory</i>
<i>Brian Rashap</i>	<i>CNM Ingenuity</i>
<i>Stuart Rose</i>	<i>The Bioscience Center</i>
<i>Nora Sackett</i>	<i>New Mexico Economic Development Department</i>
<i>Jurgen Schmidt</i>	<i>Los Alamos National Laboratory</i>
<i>Jennifer Sinsabaugh</i>	<i>New Mexico Manufacturing Extension Partnership</i>
<i>Laura Stonehill</i>	<i>Los Alamos National Laboratory</i>
<i>Stephanie Tofighi</i>	<i>New Mexico Bioscience Authority</i>
<i>Ken Van Winkle</i>	<i>New Mexico State University Technology Research</i>
<i>Steve Yarbro</i>	<i>Heavy Oil Solutions Inc.</i>

ACKNOWLEDGEMENTS

THANK YOU

to everyone who contributed to this report.

TRGR Staff

Sharon Evans

Sandia National Laboratories

Jeffrey Hall

New Mexico Manufacturing
Extension Partnership
Los Alamos National Laboratory

Judy Hendricks

Sandia National Laboratories

Mariann Johnston

Los Alamos National Laboratory

David Kistin

Sandia National Laboratories

John Martinez

Sandia National Laboratories

Genaro Montoya

Sandia National Laboratories

Lucas Reiglesperger

New Mexico Manufacturing
Extension Partnership
Los Alamos National Laboratory

Jeanette Trujillo-Rondeau

Los Alamos National Laboratory

Linda von Boetticher

Sandia National Laboratories

Joseph West

Los Alamos National Laboratory

Julia Wise

Los Alamos National Laboratory

TRGR Progress Report Team

Sandia National Laboratories

- David Kistin, *Manager*
- Genaro Montoya, *Program Leader*
- Sharon Evans, *Financial Administrator*
- Linda von Boetticher, *Annual Report Project Manager*
- Victoria Aranda, *Designer*
- Ellen Cline, *Writer*
- Bret Latter, *Photographer*
- Craig Fritz, *Photographer*

Los Alamos National Laboratory

- Mariann Johnston, *Deputy Program Manager*
- Julia Wise, *Program Lead*
- James Blake, *Photographer*
- David Woodfin, *Photographer*



Technology Readiness
I N I T I A T I V E

WWW.NMTRGR.ORG



Sandia National Laboratories

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525. SAND2023-11924 M



Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is managed by Triad National Security, LLC, for the National Nuclear Security Administration of the U.S. Department of Energy under contract 89233218CNA000001.



U.S. DEPARTMENT OF
ENERGY