

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2023

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission file number 001-35521

CLEARSIGN TECHNOLOGIES CORPORATION

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

26-2056298
(I.R.S. Employer
Identification No.)

8023 East 63rd Place, Suite 101
Tulsa, Oklahoma 74133
(Address of principal executive offices)
(Zip Code)

(918) 236-6461
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock	CLIR	The Nasdaq Stock Market LLC

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

Indicate by check mark whether the issuer is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

State the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold, or the average bid and asked price of such common equity, as of the last business day of the registrant's most recently completed second fiscal quarter.

As of June 30, 2023 the aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant, computed by reference to the last sale price of the common equity was \$40,360,983.

Indicate the number of shares outstanding of each of the registrant's classes of common stock, as of the latest practicable date.

As of March 21, 2024, the registrant has 39,039,273 shares of common stock, par value \$0.0001, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for the 2024 Annual Meeting of Shareholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2023.



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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND OTHER INFORMATION CONTAINED IN THIS REPORT

This Annual Report on Form 10-K, or this “report,” contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and the provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements give our current expectations or forecasts of future events. You can identify these statements by the fact that they do not relate strictly to historical or current facts. You can find many, but not all, of these statements by looking for words such as “approximates,” “believes,” “hopes,” “expects,” “anticipates,” “estimates,” “projects,” “intends,” “plans,” “would,” “should,” “could,” “may,” “will” or other similar expressions in this report. In particular, these include statements relating to future actions; prospective products, applications, customers and technologies; future performance or results of any products; anticipated expenses; and future financial results. These forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from our historical experience and our present expectations or projections. Factors that could cause actual results to differ materially from those discussed in the forward-looking statements include, but are not limited to:

- our limited cash, history of losses, and our expectation that we will continue to experience operating losses and negative cash flows in the near future;
- our ability to successfully develop and implement our technologies and achieve profitability;
- our limited operating history;
- changes in government regulations that could substantially reduce, or even eliminate, the need for our technology;
- emerging competition and rapidly advancing technology in our industry that may outpace our technology;
- customer demand for the products and services we develop;
- the impact of competitive or alternative products, technologies and pricing;
- our ability to manufacture any products we design;
- general economic conditions and events and the impact they may have on us and our potential customers;
- our doing business in China and related risks with respect to intellectual property protection, currency exchange, contract enforcement and rules on foreign investment;
- the impact of a cybersecurity incident or other technology disruption;
- our ability to protect our intellectual property;
- our ability to obtain adequate financing in the future;
- our ability to retain and hire personnel with the experience and talent to develop our products and business;
- our success at managing the risks involved in the foregoing items; and
- other factors discussed in this report.

Forward-looking statements may appear throughout this report, including without limitation, the following sections: Item 1 “Business,” Item 1A “Risk Factors,” and Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations.” The forward-looking statements are based upon management’s beliefs and assumptions and are made as of the date of this report. We undertake no obligation to publicly update or revise any forward-looking statements included in this report. You should not place undue reliance on these forward-looking statements.

Unless otherwise stated or the context otherwise requires, the terms “ClearSign,” “we,” “us,” “our” and the “Company” refer to ClearSign Technologies Corporation and its subsidiary, ClearSign Asia Limited.

PART I

ITEM 1. BUSINESS

Introduction

We design and develop technologies that have been shown to significantly improve key performance characteristics of industrial combustion systems, including emission and operational performance, energy efficiency, safety and overall cost-effectiveness. We believe that our patented ClearSign Core™ technology can enhance the performance of combustion systems in a broad range of markets, including the energy (upstream oil production and down-stream refining), institutional, commercial and industrial boiler, chemical, and petrochemical industries. Our ClearSign Core technology, which is our primary technology, uses either a porous ceramic structure or metal flame holder device held at a distance from the injection planes of a burner to significantly reduce flame length and achieve low emissions without the need for external flue gas recirculation, selective catalytic reduction, or high excess air systems. To date, our operations have been funded primarily through sales of our equity securities. We have earned nominal revenue since inception in 2008.

Our combustion technology has been successfully deployed in commercial projects such as down-stream refining and upstream oil production. These applications include both our process burner and boiler burner technologies. Our process burner technology is able to operate in high-intensity multiple burner industrial applications at sites that are required to meet low air pollutant emissions. Our boiler burner technology, which has been proven to achieve ground-breaking low air pollutant emissions, has been deployed in the US and is currently undergoing commercialization in China.

We believe that combustion equipment utilizing ClearSign Core technology is more effective and cost-efficient than current industry-standard air pollution control technologies, and can reduce nitrogen oxide (NOx) emissions down to the levels required by new stringent emission regulations. NOx is a regulated greenhouse gas pollutant comprised of nitrogen oxide and nitrogen dioxide. These current technologies include selective catalytic reduction devices (SCRs), low- and ultra-low NOx burners, external flue gas recirculation systems and other similar technologies. Such air pollution control systems are widely used in places within our current target markets such as in petroleum refining and petrochemical process heaters, large-scale once through steam generators (OTSGs), enclosed flares, institutional commercial and industrial boilers and other similar equipment. We believe that our ClearSign Core technology can provide value to our customers not only by helping them meet current and possible future legislative mandates to reduce pollutant emissions, but also by improving operating efficiency and increasing overall return on investment.

Based on the operating data we have obtained from our installed products, burners utilizing ClearSign Core technology can provide increased heat transfer efficiency as compared to other emission reducing technologies. This is consistent with the physics of heat transfer and the mechanisms by which the technology functions. The reported increased heat transfer efficiency may potentially result in cost savings in the low to mid-single digit percentage range for burners employing our technology. We believe that these potential costs savings could produce an extremely attractive pay-back period for an investment in ClearSign Core technology-based burners. In addition, because the flame volumes in heaters utilizing ClearSign Core technology are typically small, heaters using our technology are expected to operate at a lower cost, have increased productivity, and require less maintenance and downtime compared to heaters that operate with enlarged flames produced by traditional low NOx burners. The flames in a ClearSign Core system are established from a predominantly premixed stream of fuel, combustion air and flue gasses stabilized on a downstream structure that promotes turbulence and ignition with minimal “bulking up”. In comparison, flames resulting from the traditional legacy process of slow mixing of the fuel and air, and dilutive inert flue gasses have a much larger size. With a lower volume flame in a ClearSign Core system, surfaces in the heater or boiler experience less touching by the flame and it is anticipated that our systems can virtually eliminate flame impingement. Our technology also enables burners to function better in tightly spaced heaters compared to the flames of traditional low NOx burners. Most importantly, using our technology has the potential to decrease process downtime required during installation compared to retrofits utilizing the legacy technology of SCRs or flue gas recirculation systems.

We are also designing and commercializing a range of sensing products called the ClearSign Eye™ for two potential markets. The primary addressable market is similar to that of our ClearSign Core technology, although not limited to regions requiring emissions reduction. The flame sensing products are applicable to all installed burners that use a pilot for ignition, including in markets and regions beyond those where reducing emissions is a high priority. Like our burner technology, our burner sensing technology is being developed to provide convenient replacement and retrofit solutions for existing equipment as well as for inclusion in newly built equipment.

The secondary potential market for our sensing technology is outside of the typical combustion industry and includes transportation industries. While use of this fundamental technology in applications intended for transportation markets is proven, the

development and refinement of specific products, obtaining the certifications required for commercial deployment and establishing an efficient manufacturing source and channels to market will take some time, and we cannot assure that these goals will be achieved. We believe that the opportunities for application of our sensing technology in the transportation market are global and of great value, but it will also take longer to commercialize products targeted for this market for the reasons stated above.

Overall, our sensing technologies could provide future diversification as well as the opportunity for continued business expansion and growth beyond the maturation of our combustion-related businesses.

Our Industry

The combustion and emissions control systems markets are significant, both with respect to the wide array of industries in which the systems are used and the amount of capital spent installing and upgrading the systems. Combustion systems are used to provide heat for many different industrial and commercial processes, including boilers, petrochemical process heaters, and waste disposal systems. In order to maximize energy efficiency while keeping pace with regulatory guidelines for air pollution emissions, operators of combustion systems are continually installing, maintaining, and upgrading a variety of costly process control, air pollution control and monitoring systems. Although we believe that there are many potential markets for our ClearSign Core technology, to date we have limited the introduction of this technology to petroleum refining process heaters, energy infrastructure process heaters, boilers for steam and hot water generation, boilers for building heating systems, and enclosed flares. We have initially targeted these markets for various reasons, such as, but not limited to: (i) environmental regulations imposed on these markets, (ii) total available market size, (iii) this technology being the most readily adapted to the needs of these industries and (iv) management experience and expertise.

Our initial target markets center on the energy sector, including downstream oil refineries through the use of process heaters and boilers as well as upstream crude oil production through the use of Once Through Steam Generator (OTSGs) and wellhead enclosed flares. We believe operators in our domestic target markets are under pressure to meet current and proposed federal, state and local pollution emissions standards. The standards applicable to our target markets have been developed over the past 50 years with broad political input. Due to the localized effects of poor air quality, we expect these standards to continue to become more stringent regardless of political leadership. As an illustration, air pollution emission standards are most stringent in the states of California and Texas, which historically have had leadership from different political parties. We believe this to be the case in the U.S. and worldwide in most major developed and developing countries. As a result, these standards are a significant driver for our development and sales efforts. We believe that our ClearSign Core technology can provide a unique, cost-effective pollution control solution for operators in comparison to known competing products.

In the U.S., emissions standards largely emanate from the Clean Air Act, which is administered by the Environmental Protection Agency (EPA) and regulates six common criteria air pollutants, including ground-level ozone. These regulations are enforced by state and local air quality districts as part of their compliance plans. As a precursor to ground-level ozone, NO_x is a pollutant that is regulated by local air quality districts in order to achieve the EPA limits. The 8-hour ground-level ozone regulations have been reduced from 80 parts per billion (ppb) in 1997, to 75 ppb in 2008, and 70 ppb in 2015, with the requirement of realizing these levels approximately 20 years following the year of legislation.

We have noted that local air quality districts designated by the EPA as “severe non-attainment zones” in California and Texas have undertaken a review of their air pollutant emissions regulations. These reviews are ongoing, in most regions, but two important regions have recently amended their local regulations to improve air quality. In December of 2020, the San Joaquin Valley region of California revised its regulations to require significant reductions in target NO_x emissions from boilers, steam generators and process heaters. And, in November of 2021, the greater Los Angeles area also revised its regulations. These revised regulations substantially reduced target emissions for process heaters, boilers and other similar equipment pursuant to a new and comprehensive Best Available Retrofit Control Technology (BARCT) analysis, which we believe will result in an increased demand for our services and products.

On February 2, 2024, the South Coast Air Quality Management District of California (SCAQMD) as part of its periodic public participation process to enhance existing Best Available Control Technologies (BACT) determinations, assessed the process burner performance of our ClearSign Core™ burner technology in certain currently operating customer installations. As a result of this assessment, SCAQMD approved new BACT performance guidelines for both single and multi-burner configurations. BACT guidelines are periodically updated by SCAQMD to reflect advancements in technology and to ensure affected equipment utilize the most efficient technologies. While the establishment of a new BACT benchmark does not specifically endorse ClearSign or our products, it does establish a limit in the industry that favors our products. According to SCAQMD, BACT is the most stringent

emission limitation or control technique for a class and category of equipment that is “Achieved in Practice,” or “Contained in a State Implementation Plan” (SIP), or “Technologically Feasible.”

In addition, new regulations are starting to be adopted with respect to the NO_x emissions of enclosed ground flares, which historically have not been viewed as a source of NO_x emissions or subject to the same level of regulation. We believe that our ClearSign Core technology is well-suited to address the challenges faced by oil producers and other industries in complying with current and predicted future local air emission standards. There are multiple ClearSign Core flare applications now operational in California with NO_x emissions below the levels required by new regulations.

In addition, we believe that current emissions standards in Europe, the Middle East, parts of Asia and Canada will continue to become stricter as these jurisdictions seek to achieve cleaner air. Existing and new emissions standards in such jurisdictions may create additional market opportunities for us. To date, we have one installation operating in the refinery of a major global oil refiner in Europe.

The current environmental impetus to reduce CO₂ emissions has created an interest in burner technology that can use hydrogen as a fuel source. Because hydrogen burns at a higher temperature than most other fuel gasses, it tends to create more NO_x emissions. ClearSign Core burners have demonstrated the ability to burn fuels with up to 80% hydrogen while still controlling NO_x emissions to meet required regulatory levels. We believe that we can extend the capability of our ClearSign Core technology to burn “pure” hydrogen fuel.

Our Proprietary Technology

ClearSign Core Burner Technology

The name “ClearSign Core” was adopted to describe the inclusion of ClearSign’s burner technology in the products of original equipment manufacturers (OEM). Including our technology in OEM burner products enables us to leverage our technology by providing OEMs with the ability to offer a new product range with our technologies’ unique capabilities and differentiated product performance.

Our ClearSign Core burner technology consists of an industrial burner body and a downstream flame stabilizing structure made of either porous ceramic or metal. When the unreacted mixture of gaseous fuel and air is directed at the flame stabilizing structure, the mixture ignites and the flame forms either within or immediately downstream from the structure itself. Because the fuel and air have more time to become a homogeneous mixture, NO_x-forming hot spots and chemistry typically produced by such hot spots is reduced. In addition, the mixing and combustion propagating from the flame-stabilizing structure results in a dramatically shorter flame. The ability to modify the flame stabilizing structure enables a high level of control over the flame shape for optimization in a wide range of different applications. For example, we believe our ClearSign Core products, without any external fans or associated power, can significantly reduce the harmful emission of NO_x to levels of 5 ppm or below, depending on the application. The shorter flame in a ClearSign Core product can also potentially allow a furnace to operate at a higher capacity. We believe that heaters using the ClearSign Core will be able to remain in operation for an extended time before the need for maintenance as its flame structure and heat transfer profile minimize the possibility of flame impingement, reduce the likelihood of carbon deposits forming on the inside surfaces of the process tubes (coking) and reduce the likelihood of process tube failure all while operating with enhanced thermal efficiency.

Refinery and Petrochemical Heater Technology



Boiler Technology



ClearSign Core Process Burner Technology

Our ClearSign Core burners provide a simplified, pre-engineered and standardized direct burner replacement for traditional refinery process heaters. We believe that this product minimizes the customized engineering associated with retrofits and lends itself to mass production. The product was designed to enable quick and easy installation in single burner or multi-burner heaters or furnaces. We believe that the simplicity of the actions required to retrofit refinery process heaters with the ClearSign Core technology, and the potential ability to install these burners will potentially contribute to demand for our ClearSign Core process burners.

ClearSign Core Boiler Burner Technology

Our ClearSign Core technology for boiler burners is essentially the same as our technology for process burners, but with different component details. Boiler burners have a different orientation and internal chamber dimensions, operate with a relatively high combustion air pressure, and, in the case of small fire tube boiler burners, have a lower fuel gas pressure. Our go to market strategy of incorporating the ClearSign Core technology into a typical OEM process burner is the same as for our boiler burners.

ClearSign Core Flaring Burners

Our ClearSign Core flaring technology incorporates the same mechanisms as our burner technology, namely directing the fuel gas (typically waste gas), into an air stream with that air and gas mixture forming a flame stabilized downstream on a flame stabilizing structure. This technology has been configured into standard modular designs that can be used individually, or in combination, to provide a flare product with extremely low NO_x emissions. We have designed standardized flare configurations with standard firing capacities that can be combined in varying quantities to produce flares with different firing rates.

ClearSign Eye™ Flame Sensor

The ClearSign Eye™ flame sensor is an electrical flame sensor for industrial applications. Unlike the traditional technology, called “flame rods”, the ClearSign Eye sensing electrodes do not need to make contact with the flame. We are continuing to pursue “first adopter” installation opportunities for this patented sensing technology. We have multiple options open to us as channels to market, one of which includes manufacturing the sensors ourselves as an OEM and selling them to customers either directly or indirectly through intermediaries, and another being licensing. We believe our sensing technology is valuable because it potentially provides a very reliable alternative or replacement technology for critical industrial burner safety equipment. The currently available flame sensors are unreliable and require frequent maintenance. Our flame sensors can potentially be used with other combustion equipment such as flares, thermal oxidizer burners and boiler burners.

Our sensing technology can detect the capacitance of a flame while being physically outside of the flame envelope. As a result, our sensors can be easily retrofitted into existing burner technology. In addition, because the entire sensor probe can be positioned in a cool region, the ClearSign Eye can be manufactured with electrodes that have an optimized shape to provide the most robust signal and using processes and materials that provide an extremely long functional life.

Development of Our Technology

To date, we have deployed our ClearSign Core technology through retrofits and replacements of existing burners and complete replacement units in the case of our process burner and boiler burner products. Retrofits often involve engineering around an existing burner architecture that can complicate the ClearSign Core burner installation, whereas replacements are more straightforward and more amenable to being sold and installed by third parties, enabling more expansive channels to market. Because of this, we have focused the development of our technology to provide designs that can be included into our prospective customers’ equipment as self-contained modules or assemblies rather than projects involving the re-engineering of existing burner systems. In this form, we believe that the ClearSign Core burner technology is ideally suited for installation into new heaters and burner replacements, including heater and furnaces requiring large quantities of burners. In addition, this strategy also provides for simple new burner installations, or burner replacements to reduce emissions in boilers ranging from small fire tube boilers to large water tube boilers. We have also developed the ClearSign Core flare technology into similar repeatable forms to aid its inclusion in standard industry installations on a commercial scale with multiple installations now operational in California.

For simplification and marketing, we have adopted the term “ClearSign Core” to refer to the inclusion of our standardized proprietary combustion technology into a variety of combustion equipment types including, but not limited to, process heater burners, boiler burners, burners for thermal oxidizers and flares. Earlier ClearSign technology-based heater retrofits, in which a continuous ceramic “wall” was suspended above the existing burners, also continue to operate, and are referred to as “Duplex” technology. Although the combustion controlling principles of both the “ClearSign Core” and “Duplex” technologies are the same, ClearSign Core products have standardized technology and we believe they are easier to use and have a different channel to market.

ClearSign Core burners currently operate in multiple boilers, heaters and flares and meet new compliance standards enacted by California air authority. We also have products in commercial use in Europe and certified for sale in the Chinese boiler market. As noted above, our principal technologies have been developed into standardized designs. Our business development activities are now focused on developing customer acceptance and adoption within what we believe are the most efficient channels to market. The industries using our technology take a conservative approach to adopting new technology and place significant reliance on references from existing customers when selecting new equipment. A major focus of our current business development activities is to make early sales and build our reference list in both the process burner and boiler burner industries. We also seek to provide comprehensive technical support to our sales efforts as well as demonstrate our technology and products in operation. We are currently able to demonstrate our products while operating in rental boilers, industrial scale process burner test furnaces, and at customer locations when permissible.

ClearSign Core Technology Product Applications

To date, we have deployed our ClearSign Core technology through the retrofit or replacement of existing burners. As noted above, retrofits often involve engineering around an existing burner architecture that can complicate the installation. By developing our ClearSign Core technology into a replacement product, we have been able to standardize our designs and simplify supply-chain demands. In addition, we have enabled collaboration with other commercial equipment suppliers with the intent to incorporate our ClearSign Core technology into their standard product lines. We believe that this further development of our products has greatly increased our ability to collaborate with partners to extend our potential market reach and the resources we make available to our prospective customers.

Process Heaters in the Oil Refining, Petrochemical and Gas Processing Industries

To date, we have retrofitted six process heaters with our new ClearSign Core process burners for refineries and fuel distributors, some of which are owned by global supermajor companies and Fortune 500 companies. Sites include four locations in California and one in Europe. The ClearSign Core design provides a more simplified, pre-engineered and standardized direct burner replacement for traditional refinery process heaters that we believe can be mass produced and reduce the need for the customized engineering associated with typical retrofits. The ClearSign Core design (including the boiler burner version) is our most developed burner product. It operates essentially in the same way as a standard burner, including fitting into a heater and integrating with existing control systems. We believe that this product is suitable for licensing as well as potential manufacturing arrangements with OEMs that have established manufacturing and distribution capabilities. At this time, we have a collaboration agreement in place with Zeeco Inc., one of the world's largest combustion equipment manufacturers ("Zeeco"). The selling and marketing of our process burners pursuant to this agreement, however, is contingent upon terms still under negotiation.

In 2021, we received our first international purchase order for a ClearSign Core refining process heater from a global supermajor refining company. This marked the second order we received from a global supermajor company. This international order was installed in 2021 and successfully placed it into full operation by the customer in January 2022. In addition, we fulfilled a multi-burner order for a Fortune 500 infrastructure company that continues to consistently meet all performance requirements including compliance with the California site's air quality permit. The process burner installed at this site was used by SCAQMD to set new BACT guidelines (see discussion above under the "Our Industry" section). We also received a purchase order in 2022 from a California refinery for our ClearSign Core process burners. To date, this purchase order is the largest received by ClearSign with the total order quantity amounting to twenty burners. Due to project delays, which were outside of our control, the process burner for this order has not yet been shipped to the jobsite. On May 18, 2023, we received an order for thirteen process burners from an existing California refinery customer. The order covered retrofitting two heaters, one of which we satisfied the contractual obligations for during the fourth quarter of 2023. The process burners installed in this heater passed the customer's NOx emissions permit level, which was validated by a third-party inspector. We expect to satisfy the contractual obligations for the second heater during 2024.

In 2023, we received a purchase order from a heater manufacturer to install a modified ClearSign Core boiler burner into a horizontally fired process heater. The end customer was a chemical company located in Texas. We believe this project was a significant achievement to us, specifically for its ability to demonstrate a new product offering; Moreover, we believe this order may be the first step towards more stringent changes to the Texas air emissions regulations, which we expect will turn into additional demand for our technology.

As we seek to expand the markets into which we can sell our products, we plan to continue extending the range of ClearSign Core process burners to enable the replacement of other burner shapes and configurations, as well as for use in alternate process applications.

Hydrogen Process Burners

We are currently in the research and development phase to design a one-hundred percent 100% hydrogen capable ClearSign Core process burner. The goal of this project is to develop an ultra-low NOx hydrogen burner, which we believe will enable the adoption of hydrogen fuel for industrial heating, leading to reductions in the industrial emissions of both carbon dioxide and nitrogen oxides. Current burners and previous efforts to decarbonize industrial combustion processes through the utilization of hydrogen fuel are inhibited by the lack of industrial hydrogen burners capable of burning pure hydrogen while controlling emissions of NOx emissions to the most stringent levels required in the industry.

We have received a series of grants from the Department of Energy (DOE) to fund the development of this technology. In total, the two DOE awards approximate \$1.9 million with a target end date occurring in 2025. Refer to the financial statement "Note 11 – Government Assistance" for further details about these monies.

Industrial Commercial Boilers

Boilers are used in many industrial applications, and smaller scale commercial and residential applications, to generate steam and hot water. A large number of boiler manufacturers produce many styles of boiler equipment for these different applications. In our target markets, boilers exist in two different industry-standard forms: water tube, which tend to be larger and in which the water or steam flows through a series of tubes that surround the space in which the flame forms; or fire tube in which the flame is formed inside a large tube that passes through the outer vessel holding the water.

Our “Core” boiler burner technology has been developed to enable it to be used in a series of consistently designed sizes ranging from small fire tube boilers up to large industrial water tube boilers. For fire tube products, we have developed our own patent protected burner replacement product that is similar in concept to our ClearSign Core burners for process heaters. These boiler burners have achieved performance levels meeting the most stringent new California NOx regulations, in a typical commercial fire tube boiler produced by one of the industry’s largest suppliers in the U.S. For instance, through our collaboration agreement in place with California Boiler to sell, deliver, install and service fire tube boiler burners in the U.S., we were able access larger sizes of fire tube boilers in order to verify the function of a range of fire tube boiler burners.

In 2023, we received two purchase orders for our ClearSign Core boiler burner technology. Both boiler burner purchase orders were sold as a package with our partner California Boiler into the San Joaquin Valley Air Pollution Control District of California. The NOx emission permits for these boilers vary, with one boiler noted at 5ppm and the other at 2.5ppm. Third-party source testing has validated the 5ppm emission order, but due to customer on-site construction delays, the other order has yet to be installed.

Additionally, we demonstrated the operation of our small fire tube burner for Chinese officials, who subsequently certified it for sale in China. We plan to seek certification of larger fire tube and water tube boiler burners with our collaborative partner Jiangsu Shuang Liang Boiler Co. Ltd, which is a subsidiary of China's Shuang Liang Group Co. Ltd and one of China's top 500 enterprises. If further testing and certification is successful in China, our goal will be to sell the boiler burner technology into the very large Chinese market through our collaborative partnership. We anticipate making continued progress during 2024 both demonstrating and commercializing such equipment.

Wellhead Enclosed Flares

Based upon discussions with local regulators and the examination of regulatory reports, we believe that certain regions are targeting enclosed flare emissions for increased future regulation. California, for example, has already added new low NOx emissions regulations for flares. We have adapted ClearSign Core technology to suit this application. Our collaboration agreement with the field engineering and servicing company California Boiler includes flare sales and installation. To date, we have four flare units installed and operating in California resulting from this California Boiler collaboration agreement.

OTSGs for the Enhanced Oil Recovery Industry

We have successfully installed our Duplex technology in three OTSG projects in the enhanced oil recovery industry in California. Field data reported by our customers indicates significant efficiency improvements resulting from the installation of the ClearSign technology. We believe our new standardized boiler burner range of products is also well suited to this application.

Sensing Products

We are currently seeking first adopters to install our flame sensors for field demonstration. Although we have not yet completed the product launch of our sensing products and subsequent commercialization, we have obtained clear and consistent customer feedback guiding its first application. The target market for this technology is potentially every burner with a pilot on which flame sensors are deployed, providing a global and very high-volume opportunity. This market is not limited by emissions mandates or the type or manufacturer of the burners. The product has value for retrofit applications, where it is applied to existing burners, and for new burners, where it can be installed in burners by OEMs.

We are assessing the possibility of manufacturing the sensing products ourselves as well as partnering with one or more established OEM suppliers. Demonstration units have been manufactured and we currently have the ability to manufacture the sensor ourselves for the foreseeable future. We are also exploring alternative paths to monetize the technology, including opportunities to license our technology.

The fundamental technology for the sensors envisioned for transport applications is the same as for the flame sensors, but the application and form of the final product will be very different. We have received notable interest in this product from a major global customer giving us the confidence that there is a potential market for this technology, which is therefore worthy of future investment. This sensor product is in the very early stages of development and would be deployed in a highly regulated environment requiring a thorough product development process. The interest we have received to date, however, suggests that this could potentially be a significant future business opportunity for ClearSign.

Our Target Markets

Our ClearSign Core products compete in the combustion and emissions control markets. These industries are highly competitive and currently dominated by companies that have comparatively more established products and substantially greater infrastructure, customer support networks, and financial resources. Based on testing and completed field installations to date, however, we believe that our ClearSign Core technology provides several unique and powerful business solutions for our customers, including, but not limited to: (i) overall cost-effective installation, (ii) energy efficiency, (iii) operational performance and (iv) significantly reduced emissions. Further, we believe that our technology is well-suited to create substantial synergistic value by incorporating it into mainstream commercial offerings with the market incumbents, thus leveraging the “ClearSign Core” technology along with the established breadth and capabilities of collaborating companies, such as Zeeco and California Boiler.

We are targeting the following segments of the combustion market for adoption of our ClearSign Core technology:

- institutional, commercial and industrial boilers;
- refinery, energy infrastructure and petrochemical process heaters;
- enclosed flares; and
- enhanced oil recovery steam generators

In each of these segments, we are marketing solutions that include our ClearSign Core technology which we believe could simultaneously improve productivity, operational efficiency and pollution control.

Our target markets are greatly affected by air emission regulations and economic conditions. Accordingly, we prioritize our activities in target market segments geographically based on the needs of the local industries and the current and anticipated future requirements imposed by local environmental regulation. Details regarding the localized effect of environmental regulation in the United States are described in the section of this report titled “Our Industry.” In general, our immediate regional opportunities are in the West and Gulf Coasts of the United States and China.

Competition, Barriers to Entry and Go to Market Strategy

The industry in which we operate is global in scope and populated by large, established suppliers of burners and post-combustion air pollution control systems. These suppliers possess resources that are substantially greater than ours. Worldwide, suppliers of burners and air pollution control equipment include but are not limited to companies such as Callidus, Eclipse and Maxon (all three are subsidiaries of Honeywell), John Zink Hamworthy Combustion (a subsidiary of Koch Industries and including Coen), General Electric, Haldor Topsøe, Hitachi, Linde, Zeeco, Fives Group, Cleaver Brooks, Power Flame (a subsidiary of Aztec Inc.), and others.

These companies provide systems that include low and ultra-low NOx burners, selective and non-selective catalytic reduction systems, and other pollution control technologies. They are well-established and their combustion and emissions control systems are based mostly on mature, well-understood and proven technologies. As a result of the relatively slow pace of developing and adopting innovation, we believe the technology and products currently being offered by our large competitors have become commoditized with differentiation between suppliers most often based on price. These industry characteristics provide both an opportunity and a barrier to more nimble, disruptive companies.

From a customer's perspective, installation of legacy air pollution control technologies is viewed as a method of avoiding fines, as a cost of doing business, and as a means to operate within current and anticipated future regulatory requirements.

Unlike most other kinds of capital equipment that provide an economic return through enhanced productivity or efficiency, we believe customers of traditional emissions control equipment do not expect any positive return on emissions control investments other than the ability to continue to operate or avoid fines. We believe the ClearSign Core suite of products are further differentiated from its competitors because they give prospective customers the opportunity to greatly reduce capital investment and, in certain cases, realize a return on investment through increased efficiency and/or increased productivity.

As indicated above, we are seeking to develop our business in the combustion and emissions control market and to establish ourselves in a highly competitive industry among companies that have substantial financial resources, a well-developed infrastructure and established products. Our business development strategy seeks to obtain recognition of our technology's value while minimizing the challenges inherent in this market including the strengths of the other market participants.

Major barriers faced by a new equipment manufacturer seeking to enter this market include:

1. *Developing engineering, order fulfillment and customer service staff:* Especially in the refining and petrochemical industries, customers require specialist support throughout the life cycle of the combustion equipment including with order execution when purchasing. Recruiting and developing sufficient staff with the special skills necessary to provide the level of service required by customers in this market would take time and result in a significant ongoing overhead cost.
2. *Developing operational infrastructure:* Again, especially in the refining and petrochemical industries, customers require thorough quality assurance procedures, including demonstration of an item from their order, to prove that it meets performance guarantees. This requires, among other things, having access to a test furnace. Developing such an operation would require significant investment and ongoing costs.
3. *Conservative customers:* Our customers are very careful and methodical about adopting a new technology or product because of the complexity of their infrastructures, the cost of downtime in any part of a processing plant and the potential safety hazards of their operations.
4. *Profit opportunity:* There is very little differentiation between the products offered by the established burner equipment providers, which results in thin profit margins for the sale of new or replacement burners. A significant portion of a company's profit results from the sales of replacement parts and equipment upgrades. Any new entrant without a differentiating technology will not have this established source of significant and immediate profit.

We developed our "go to market" strategy for the ClearSign Core combustion business considering our strengths and weaknesses. The most important weaknesses are related to the barriers to entry identified above. We are a small company with limited financial resources and do not have the infrastructure to meet the requirements of our sophisticated target global customers without significant investment and increase in operational costs. Although we have highly skilled and experienced employees, we do not have the manpower to provide comprehensive service and customer support ourselves. We believe that it is in the best interests of the Company and our shareholders to develop our business utilizing an "asset light" model. Accordingly, we seek to collaborate with strategic partners to the extent possible to sell our products and maximize the profitability of those sales.

Our strengths include our technology, which has been developed to provide a standard set of "core" components that can be incorporated into any generic OEM burner body. These components enable unique performance that minimizes emissions and controls flame size. Our strengths also include the market opportunity potentially created by new and anticipated environmental emissions control regulations. These regulations will potentially require combustion performance that either exceeds the technology available from the incumbent equipment manufacturers or requires retrofitting existing equipment with a post-combustion clean up apparatus. Installing clean-up apparatus is very expensive especially for small to mid-sized heaters. We believe that the incumbent burner OEM product development approaches are, and will continue to be, incremental in nature, and are unlikely to pose a significant threat to the value provided by ClearSign Core technology in the foreseeable future.

Our business has been, and continues to be, developed with the goal of combining our technology with the infrastructure and resources of major OEM equipment manufacturers. Through such collaborative arrangements, OEM burner manufacturers can reap the benefits of adding truly differentiated and unique product lines to their offerings and ClearSign can overcome the barrier to market of needing to build capital and operating expense-intensive infrastructure and hiring a large specialist staff. In addition, we believe that having orders fulfilled by a well-known and trusted supplier will reduce the risk, as perceived by prospective customers, of dealing with a small company and aid in the adoption of our technology.

Our business plan contemplates forming collaborative partnerships with major OEM equipment manufacturers. At this time, we have demonstrated that our technology has commercial viability by generating interest from OEMs and end users. We expect that developing strategically chosen collaborative partnerships will result in supplying ClearSign Core technology to major global customers in large quantities together with the attendant engineering, quality control, customer support and project management services required by these sophisticated customers. We also believe that our collaborative partnerships will enable our OEM partners to offer a unique product in the marketplace and provide both parties with a potentially significant commercial opportunity. Forming such alliances is expected to dramatically accelerate the global sales and market adoption of our technology. As announced in June 2019, we already have an agreement in place with Zeeco, who is one of the world's largest burner manufacturers, to globally manufacture ClearSign Core process burners. The selling and marketing of our process burners pursuant to this agreement, however, is contingent upon terms still under negotiation. In addition, we have a collaborative agreement with California Boiler to sell and

produce both fire tube boiler burner and flare products. We are also pursuing various licensing types of arrangements for other market verticals and ClearSign Core applications.

Pricing Strategy. We believe that the unique capabilities of our technology improve combustion equipment performance and provide significant economic value to our customers compared to the next best alternative solutions available. As a result, we expect that products containing ClearSign Core technology will sell at prices based on the value they offer rather than pursuant to standard competitive pricing that our competitors are forced to use in these mature markets.

Suppliers and Subcontractors

Due to our “asset light” model, we use subcontractors to source, warehouse and manufacture our products. This model allows us to maximize the value of our limited resources while minimizing capital investment. Our subcontractor, for the process burner product line, is intentionally single sourced through a collaborative agreement with a well-known and established industry leader, Zeeco. Our boiler burner product line is not dependent upon a single-sourced subcontractor. While we continuously assess, for any improvements in productivity and supply chain efficiency, there can be no assurance that our subcontractors will not experience supply interruptions, production capacity constraints or working capital limitations, which could adversely affect our business.

Raw steel and fabricated steel parts are a major component of our product cost, purchases of which are subject to the needs and specifications of our customers or subcontractors. Periodic changes in the price of steel may affect our final product pricing to customers. In addition, increases in the costs of raw steel or other supplies may also increase our working capital requirements, warranty obligations and product profitability.

Supply interruptions, tariffs or price increases may slow production, delay shipments to our customers or increase production costs in the future, any of which could adversely affect our financial results; however, we intend to pass along production cost increases to customers to the extent we deem appropriate. We expect that delays, interruptions or non-optimal scheduling of production related to interruptions in raw materials supplies would result in an increase to our production costs. We can give no assurance that global supply-chain constraints or geopolitical conflicts will not adversely affect our ability or our subcontractors’ ability to procure raw materials and components necessary to build our products.

Research and Development Program

The experience and industry contacts of our management team, board of directors, and consultants, along with potential customers in the petroleum, petrochemical, and industrial steam applications industries inform our research and development program. Field evaluation agreements, research agreements, and memoranda of understanding with potential development partners, customers and research institutions support this process. Our research and development activities make use of employees and consultants who are experts in the areas of industrial combustion, statistical experimental design, fluid mechanics and heat transfer.

With the maturation of our ClearSign Core technology, our development process has transitioned from research to commercialization. This has included optimizing the technology to perform in a manner readily adoptable by our prospective customers and easy to incorporate into the burner structures of our collaborative alliance partners. This later phase of development is influenced by customer feedback, product and component standardization, design for manufacture and inventory management simplification, both with respect to the manufacture of and lifetime support for our products.

We will continue to assess research and development opportunities to develop new product offerings where appropriate based on customer feedback and market trends. We are currently continuing to develop our flame sensing and hydrogen burner technology, which is discussed in detail under the “ClearSign Core Technology Product Applications” section above in addition to the expansion of our burner technologies into adjacent customer applications and market verticals.

Intellectual Property Protection

We have generated inventions that we believe to be patentable subject matter and for which we have been seeking protection through patent application filings. As of December 31, 2023, we have 103 active patent grants and another 34 patents pending with Patent Offices in the United States, China, and various European countries. We maintain an active review process to monitor for new inventions across the globe that threaten our intellectual property protection.

We cannot predict when our patent applications may result in issued patents, if at all. Further, we may modify a patent application in the future as we develop additional information. As a result, we may create additional patent applications from an

existing application, consolidate existing patent applications, abandon applications, or otherwise modify applications based upon our judgment in order to protect our intellectual property in a reasonably cost-efficient manner.

Government Regulation

Government regulation, particularly with respect to the environment, is likely to play an important role in shaping our product mix and offerings. In addition, field implementation of our technologies requires permits from various local, state and federal agencies that regulate mechanical and electrical infrastructure and fire and air pollution control.

We believe that we offer major advances in emissions reductions and efficiency improvements. We also believe that emissions regulations could require a reduction in pollutants such as NOx thereby potentially enhancing market demand for our technology upon implementation of any such regulations. Possible legislation related to greenhouse gases, boiler Maximum Available Control Technology (MACT) rules, or other general reductions in required pollutant levels globally, especially in the U.S. and China, could bolster our ability to meet our business objectives. Although the timing of any such regulations is uncertain, the general trend over the last decades continues to be government-mandated reduction for all criteria pollutants. Ultimately, it may be possible for our technology to achieve BARCT and/or MACT designation. We believe that the availability of our technology alone may accelerate the government's willingness to adopt more stringent environmental regulations. Further, we believe efficiency improvements, combined with the elimination of flame impingement, could generate market demand regardless of the existing regulatory framework because the potential efficiency, productivity and savings gains from our products could result in the adoption of our technology.

At this time, we believe that the current U.S. administration supports "green initiatives," and we are not aware of any current or proposed federal, state or local environmental compliance regulations that would have a material detrimental effect on our business objectives. We do not anticipate any major expenditures to be required in order for our technology to comply with any environmental protection statutes. Concurrently the Chinese government has enacted notable tightening of allowable emissions levels, particularly for NOx emissions, and we anticipate this trend will continue in the future.

Human Capital

As of December 31, 2023, we had 15 full-time employees, and no part-time employees. Our employees are not covered by collective bargaining agreements, and we believe our relationship with our employees is good.

Corporate History

We were incorporated in the State of Washington on January 23, 2008. Effective June 14, 2023, we changed our domicile from the State of Washington to the State of Delaware by means of a plan of conversion. The address of our corporate headquarters is 8023 East 63rd Place, Suite 101, Tulsa, Oklahoma 74133 and our telephone number is (918) 236-6461. Our website can be accessed at www.clearsign.com. The information contained on our website is not a part of this report. We currently operate in the United States, People's Republic of China and Hong Kong.

ITEM 1A. RISK FACTORS

We are subject to various risks that may materially harm our business, prospects, financial condition and results of operations. An investment in our common stock is speculative and involves a high degree of risk. In evaluating an investment in shares of our common stock, you should carefully consider the risks described below, together with the other information included in this report.

The risks described below are not the only risks we face. If any of the events described in the following risk factors actually occurs, or if additional risks and uncertainties later materialize that are not presently known to us or that we currently deem immaterial, then our business, prospects, results of operations and financial condition could be materially adversely affected. In that event, the trading price of our common stock could decline, and you may lose all or part of your investment in our shares. The risks discussed below include forward-looking statements, and our actual results may differ substantially from those discussed in these forward-looking statements.

Risks Related to Our Business

We are a company with a limited operating history and our future profitability is uncertain. We anticipate future losses and negative cash flows and we may never be profitable.

We are a company with a limited operating history and limited revenues to date. We have incurred losses since our inception and expect to experience operating losses and negative cash flows for the foreseeable future. As of December 31, 2023, we had a total accumulated deficit of approximately \$93.7 million. We anticipate our losses will continue to increase from current levels because we expect to incur additional costs and expenses related to commercialization activities, product development, consulting costs, marketing and other promotional activities. In addition, we expect to continue incurring costs related to human capital development and strategic partnership development. We may never generate significant revenue and we may never be profitable.

If we do not receive additional financing when and as needed in the future, we may not be able to continue our development and commercialization efforts and our business may fail.

Our business is capital-intensive and requires capital investments in order for it to develop. Our cash on hand will likely not be sufficient to meet all of our future needs because our target customers are, in general, slow to adopt new technologies, and we anticipate that we will require substantial additional funds in excess of our current financial resources for research, development and commercialization of our technology, to obtain and maintain patents and other intellectual property rights in our technology, and for working capital and other purposes, the timing and amount of which are difficult to ascertain. Until our technology generates revenues sufficient to support our operations, we plan to obtain the necessary working capital for operations through the sale of our securities, but we may not be able to obtain financing in amounts sufficient to fund our business plans. If we cannot obtain additional funding when and as needed, our business might fail.

Market acceptance of our technology and business is difficult to predict. If our technology does not achieve market acceptance, our business could fail.

If we are unable to effectively demonstrate our technology in a timely fashion, gain recognition in our market segments, and develop a critical level of successful sales and product installations, we may not be able to successfully achieve sales revenue and our results of operations and financial condition would then suffer. Our ability to achieve future revenue will depend significantly upon achieving a critical mass of market awareness and sales to potential customers of our products. While we plan to achieve this awareness over time, there can be no assurance that awareness of our Company and technology will develop in a manner or pace that is necessary for us to achieve acceptance and profitability in the near term.

Further, we cannot predict the rate of adoption or acceptance of our technology by potential customers. While we have demonstrated our technology, this does not guarantee the industrial combustion market will accept it, nor can we control the rate at which such acceptance may be achieved. In certain market segments of ours, there is a well-established channel with a limited number of companies engaged in reselling to our target customers. Failure to achieve productive relations with a sufficient number of these prospective partners may impede adoption of our technology. Additionally, some potential customers in our target industries are historically risk-averse and have been slow to adopt new technologies. If our technology is not widely adopted in the industrial combustion market, we may not earn enough by selling or licensing our technology to support our operations, recover our research and development costs or become profitable and our business could fail.

Our efforts may never demonstrate the feasibility of our product.

Our research and development efforts remain subject to all of the risks associated with the development of new products based on emerging and innovative technologies, including without limitation unanticipated technical or other problems, our ability to scale our technology to large industrial applications, conditions in the field during installation and the possible insufficiency of funds for completing development of these products. Technical problems, including those specific to customer site implementation, may result in delays and cause us to incur additional expenses that would increase our losses. If we cannot complete, or if we experience significant delays in completing, research and development of our technology for use in potential commercial applications, particularly after incurring significant expenditures, our business may fail.

Changes to environmental regulations could make our technology less desirable.

The negative environmental impacts of industrial activity have given rise to significant environmental regulation in industrialized countries. These regulations are important incentives in the adoption of technologies like ours. To the extent that

environmental regulations in the U.S. and in other industrialized countries are modified in the future, or even relaxed, our technology may not produce the results required, or may even be unnecessary, to comply with the modified regulations. If federal, state or local regulatory agencies relax the clean air regulations our technologies are designed to address, or our customers cannot obtain air emission permits with our products, our business and results of operations could be materially adversely affected.

We may fail to adequately protect our proprietary technology, which would allow our competitors to take advantage of our research and development efforts.

Our long-term success largely depends on our ability to market our technology. We rely on a combination of patents, trade secrets and other intellectual property laws, confidentiality and security procedures and contractual provisions to establish and protect our proprietary rights in our technology, products and processes. If we fail to obtain or maintain these protections, we may not be able to prevent third parties from using our proprietary technologies. Our pending or future patent applications may not result in issued patents. In addition, any patents issued to us, or that may be issued to us in the future, may not contain claims sufficiently broad enough to protect us against third parties with similar technologies or products or from third parties infringing such patents or misappropriating our trade secrets or provide us with any competitive advantage. In addition, effective patent and other intellectual property protection may be unenforceable or limited in foreign countries. If a third party initiates litigation regarding the validity of our patents and is successful, a court could revoke our patents or limit the scope of coverage for those patents.

We also rely upon trade secrets, proprietary know-how and continuing technological innovation to remain competitive. We protect this information with reasonable security measures, including the use of confidentiality and invention assignment agreements with our employees and consultants and confidentiality agreements with strategic customers and partners. It is possible that these agreements may not be sufficient or that these individuals or companies may breach these agreements and that any remedies for a breach will be insufficient to allow us to recover our costs and damages. Furthermore, our trade secrets, know-how and other technology may otherwise become known or be independently discovered by our competitors.

We may incur substantial costs as a result of litigation or other proceedings relating to patent and other intellectual property rights.

A third party may sue us for infringing its intellectual property rights. Likewise, we may need to resort to litigation to enforce our patent rights or to determine the scope and validity of third-party intellectual property rights. The cost to us of any litigation or other proceeding relating to intellectual property rights, even if resolved in our favor, could be substantial, and the litigation would divert our efforts from our business activities. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. If we do not prevail in this type of litigation, we may be required to pay monetary damages and/or expenses; stop commercial activities relating to our products; obtain one or more licenses in order to secure the rights to continue the manufacturing or marketing of our products; or attempt to compete in the market with substantially similar products. Uncertainties resulting from the initiation and continuation of any litigation could limit our ability to continue some of our operations.

A cybersecurity incident or other technology disruptions could negatively impact our business and our relationships with customers.

We use computers in substantially all aspects of our business operations. We also use mobile devices and other online activities to connect with our employees, consultants, suppliers and customers. Such uses give rise to cybersecurity risks, including security breaches, espionage, system disruption, theft, the compromise of trade secrets and inadvertent release of information. Our business involves the storage and transmission of sensitive and/or confidential information and intellectual property, including customers' and suppliers' information, private information about employees and financial and strategic information about us. If we fail to assess and identify cybersecurity risks associated with our operations, we may become increasingly vulnerable to such risks. Additionally, while we have implemented measures to prevent security breaches and cyber incidents, our preventative measures and incident response efforts may not be entirely effective. The theft, destruction, loss, misappropriation, or release of sensitive and/or confidential information or intellectual property, or interference with our information technology systems, could result in business disruption, negative publicity, brand damage, violation of privacy laws, loss of customers, potential liability and competitive disadvantage all of which could have a material adverse effect on our business, financial condition or results of operations.

We cannot guarantee that any collaborative business research and development partnership we enter into will be successful.

Collaborative arrangements involve risks that participating parties may disagree on business decisions and strategies. These disagreements could result in delays, additional costs, risks of litigation, and failure of the development of our technology within the

combustion market segment. Success of any collaborative arrangements we enter into will depend, in part, on whether those with whom we collaborate fulfill their contractual obligations satisfactorily. If a party with whom we collaborate fails to perform its contractual obligations satisfactorily, we may be unable to make the additional investments or provide the added services that would be required to compensate for that failure. If we are unable to adequately address any such performance issues, our reputation may be materially adversely affected and we may be exposed to legal liability. Our inability to successfully maintain collaborative relationships, once we enter into them, or to enter into new collaborative arrangements, could have a material adverse effect on our results of operations.

If we are unable to keep up with rapid technological changes, our products may become obsolete.

The market for alternative environmental products is characterized by significant and rapid technological change and innovation. Although we intend to employ our technological capabilities to create innovative products and solutions that are practical and competitive in today's marketplace, future research and discoveries by others may make our products and solutions less attractive or even obsolete compared to other alternatives that may emerge.

There are inherent dangers involved in the combustion process that utilize our technologies and products and the occurrence of any associated accident may negatively impact our business.

There is inherent danger in dealing with the combustion process. There is additional danger in modifying this process in ways that are new and have only been implemented on a limited basis at a commercial scale. There is only limited data or experience available from the operation of our equipment in both testing and commercial applications to validate suitability for general commercial use. Although we have not yet encountered any areas of risk in the development or testing of our products beyond those already inherent in the combustion process or those particular to an industrial site, we may be exposed to liabilities should an industrial accident occur during development, testing, or operation in our laboratory or during field implementation of our technology. Any such liabilities could have an adverse effect on our results of operations and financial condition and adversely affect our projected development and production estimates.

We depend on approval from various local, state and federal agencies to implement and operate our technology. There is no assurance that these agencies will approve our technology.

Our technology includes enhancement of the combustion process to reduce certain emissions at a lower cost of operation than current air pollution control devices. Field implementation of our technology will therefore require permits from various local, state and federal agencies that regulate mechanical and electrical infrastructure and fire and air pollution control. Our technology may be subject to heightened scrutiny since it will be new to these governing bodies. As such, there may be delays or rejections in applications of portions of or all of our technology in the individual jurisdictions involved.

We are uncertain of our profit margins and whether such profit margins, if achieved, will be able to sustain our business.

We have not fully developed all of our products and those products that have been developed have experienced limited sales. As a result, we cannot reliably predict our profit margins. Our operating costs could increase significantly compared to those we currently anticipate due to unanticipated results from the commercialization process, application of our technology to unique or difficult processes, regulatory requirements and particular field implementations. Further, we envision our pricing to be highly dependent on the benefits that our customers believe they will achieve using our products. Accordingly, we cannot predict whether or when we will achieve profitability, and if achieved, the amount of such profit margins.

Many of our potential competitors have greater resources, and it may be difficult to compete against them.

The combustion industry is characterized by intense competition. Many of our potential competitors have better name recognition and substantially greater financial, technical, manufacturing, marketing, personnel and/or research capabilities than we do. Although at this time we do not believe that any of our potential competitors have technology similar to ours, we are aware certain potential competitors are attempting to develop similar products. Many firms in the combustion industry have made and continue to make substantial investments in improving their technologies and manufacturing processes. In addition, they may be able to price their products below the marginal cost of production in an attempt to establish, retain or increase market share. Because of these circumstances, it may be difficult for us to compete successfully in the combustion market.

The loss of the services of our key management and personnel or the failure to attract additional key personnel could adversely affect our ability to operate our business.

A loss of one or more of our current officers or key employees could severely and negatively impact our operations. We have no present intention to obtain key-man life insurance on any of our executive officers or management. Additionally, competition for highly skilled technical, managerial and other personnel is intense. As our business develops, we might not be able to attract, hire, train, retain and motivate the highly skilled executives and employees we need to be successful. If we fail to attract and retain the necessary technical and managerial personnel, our business will suffer and might fail.

There are many risks we are exposed to by doing business in China.

We are exposed to risks of doing business in China. As a result, the economic, political, legal and social conditions in China could have a material adverse effect on our business. In addition, the legal system in China has inherent uncertainties that may limit the legal protections available in the event of any claims or disputes that we may have with third parties, including our ability to protect the intellectual property we use in China. As China's legal system is still evolving, the interpretation of many laws, regulations and rules is not always uniform and enforcement of these laws, regulations and rules involve uncertainties, which may limit the remedies available in the event of any claims or disputes with third parties. Some of the other risks related to doing business in China include:

- the Chinese government exerts substantial influence over the manner in which we must conduct our business activities;
- restrictions on currency exchange may limit our ability to receive and use our cash effectively;
- the Chinese government may favor local businesses and make it more difficult for foreign businesses to operate in China on an equal footing, or in general;
- there are uncertainties related to the enforcement of contracts with certain parties; and
- more restrictive rules on foreign investment could adversely affect our ability to expand our operations in China.

As a result of our anticipated growing operations in China, these risks could have a material adverse effect on our business, results of operations and financial condition.

Finally, the U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws generally prohibit companies and their intermediaries from making improper payments or providing anything of value to improperly influence foreign government officials for the purpose of obtaining or retaining business or obtaining an unfair advantage. While we make every attempt to comply with these laws, our operations outside the United States may increase the risk of violating such laws. Violations of these laws may result in severe criminal or civil sanctions, could disrupt our business and result in a material adverse effect on our reputation, business and results of operations or financial condition.

We cannot provide assurance that rising inflation will not adversely affect our operations.

The impact of inflation on our operating results has been moderate in recent years, despite the recent increase in inflation generally across the economy. While inflation has not had a material impact upon operating results, there is no assurance that our business will not be affected by inflation in the future.

Due to the nature of our business and products, we may be liable for damages based on product liability and other tort and warranty claims.

We face an inherent risk of exposure to claims in the event that the failure, use or misuse of our products results, or is alleged to result, in death, bodily injury, property damage, or economic loss.

We cannot provide assurance that global supply-chain constraints will not adversely affect our commercialization efforts.

The impact of the global supply-chain constraints has been moderate for our company, reflecting generally modest increases in lead-time commitments from our suppliers and strategic partners. While these constraints have not had a material impact to-date, we can provide no assurance that our business will not be affected by in the future.

We are dependent on third-party suppliers.

Although we are not dependent on any one supplier, we are dependent on the ability of our third-party suppliers to supply our raw materials, such as raw steel and fabricated steel. The third-party suppliers upon which we depend may default on their obligations to us due to bankruptcy, insolvency, lack of liquidity, adverse economic conditions, operational failure, fraud, loss of key personnel, or other reasons. We cannot assure that our third-party suppliers will dedicate sufficient resources to meet our scheduled delivery requirements or that our suppliers will have sufficient resources to satisfy our requirements during any period of sustained demand. Failure of suppliers to supply, or delays in supplying, our raw materials or certain components, or allocations in the supply of certain high demand raw components, for any reason, including, without limitation, disruptions in our suppliers' business activities due to cybersecurity incidents, terrorist activity, public health crises (such as coronavirus), fires or other natural disasters could materially adversely affect our operations and ability to meet our own delivery schedules on a timely and competitive basis. Additionally, our third-party suppliers may provide us with raw materials or component parts that fail to meet our expectations or the expectations of our customers, which could subject us to product liability claims, other claims and litigation.

Failure of third parties to manufacture quality products or provide reliable services in a timely manner could cause delays in developing, constructing, and operating our projects, which could damage our reputation, adversely affect our partner relationships or adversely affect our growth.

Our success depends on our ability to develop, construct, and operate projects in a timely manner, which depends in part on the ability of third parties to provide us with timely and reliable products and services. In developing, constructing, and operating our projects, we rely on products meeting our design specifications and components manufactured and supplied by third parties, and on services performed by subcontractors. We also rely on subcontractors to perform substantially all of manufacturing work related to our projects, and we may need to engage subcontractors with whom we have no experience.

We currently have a collaboration agreement in place with Zeeco, Inc. ("Zeeco"). If Zeeco, or any of our subcontractors, is unable to provide services that meet or exceed our customers' expectations or satisfy our contractual commitments, our reputation, business and operating results could be harmed. In addition, if we are unable to avail ourselves of warranties and other contractual protections with providers of products and services, we may incur liability to our customers or additional costs related to the affected products and services, which could adversely affect our business, financial condition and results of operations. Moreover, any delays, malfunctions, inefficiencies or interruptions in these products or services could adversely affect the quality and performance of our projects and require considerable expense to find replacement products and to maintain and repair our projects. This could cause us to experience interruption in our production and distribution of our products, difficulty retaining current relationships and attracting new relationships, or harm our brand, reputation or growth. Additionally, because the Company's contracts generally include progress payments from customers upon the completion of certain defined milestones, the revenue recognition of such project will depend on our subcontractor's services in order for us to be able to achieve such milestones timely. Any subcontractor delays in fulfilling our contracts may result in delay of revenue recognition by the Company, which in turn can affect our financial condition and results of operations.

Macroeconomic pressures in the markets in which we operate may adversely affect our financial results.

Geopolitical issues around the world can impact macroeconomic conditions and could have a material adverse impact on our financial results. For example, the ultimate impact of the conflict in Ukraine, Israel and Strait of Hormuz on fuel prices, inflation, the global supply chain and other macroeconomic conditions is unknown and could materially adversely affect global economic growth, disrupting discretionary spending habits and generally decreasing demand for our products and services. While we do not purchase any of significant raw materials directly from these regions, they have significant global reach on commodity prices. Disruptions in the markets for those inputs could negatively impact the world and domestic economy. Also, these conflicts have exacerbated geopolitical tensions globally. While the demand of our services in the U.S. have not yet been affected by these conflicts, we cannot predict the impact that the conflicts may have on future financial results. For example, domestic customers for some of our product lines may choose to reduce discretionary spending on goods and services such as ours until this volatility subsides.

We are exposed to fluctuations in the market values of our investments and in interest rates, either of which could impair the market value of our investments and harm our financial results.

As of December 31, 2023, we had zero investments in short-term held-to-maturity debt security investments,

consisted primarily of U.S. treasuries; however, in the future we may further invest in long- or short-term U.S. treasuries or other marketable securities with maturities of up to one year. Currently, we do not use financial derivatives to hedge our interest rate exposure.

These investments, as well as any cash deposit in bank accounts, are subject to general credit, liquidity, market, inflation and interest rate risks, which may be exacerbated by unusual events, such as the recent hike in interest rates, potential recession and the recent debt-ceiling debate, which affected various sectors of the financial markets and led to global economic slowdown and high inflation. If the global credit and capital market continues to experience volatility or deteriorates, and to the extent we make future investments, our investment portfolio may be impacted, and we could determine that some or all of our investments experienced an other-than-temporary decline in fair value, requiring impairment, which could adversely impact our financial position and operating results.

Risks Related to Owning Our Securities

The public market for our securities is volatile. This may affect not only the ability of our investors to sell their securities, but the price at which they can sell their securities.

We completed the initial public offering of our common stock in April 2012. Since that time, our common stock (NASDAQ: CLIR) has traded as low as \$0.35 per share and as high as \$11.75 per share based upon daily closing prices, and day-to-day trading has been volatile at times. This volatility may continue or increase in the future. The market price for the securities may be significantly affected by factors such as progress in the development of our technology, agreements with research facilities or co-development partners, commercialization of our technology, variations in quarterly and yearly operating results, general trends in the alternative energy industry, and changes in state or federal regulations affecting us and our industry. Furthermore, in recent years the stock market has experienced extreme price and volume fluctuations that are unrelated or disproportionate to the operating performance of the affected companies, such as the market reactions to internet marketed ‘short squeezes’. Such broad market fluctuations may adversely affect the market price of our securities.

We have the right to issue shares of preferred stock. If we were to issue preferred stock, it is likely to have rights, preferences and privileges that may adversely affect our common stock or other securities.

We are authorized to issue 2.0 million shares of “blank check” preferred stock, with such rights, preferences and privileges as may be determined from time-to-time by our board of directors. Our board of directors is empowered, without shareholder approval, to issue preferred stock in one or more series, and to fix for any series the dividend rights, dissolution or liquidation preferences, redemption prices, conversion rights, voting rights, and other rights, preferences and privileges for the preferred stock. No shares of preferred stock are presently issued and outstanding and we have no immediate plans to issue shares of preferred stock. The issuance of shares of preferred stock, depending on the rights, preferences and privileges attributable to the preferred stock, could adversely reduce the voting rights and powers of the common stock and the portion of our assets allocated for distribution to common stockholders in a liquidation event, and could also result in dilution in the book value per share of our common stock. The preferred stock could also be utilized, under certain circumstances, as a method for raising additional capital or discouraging, delaying or preventing a change in control of the Company, to the detriment of our shareholders. We cannot assure you that we will not, under certain circumstances, issue shares of our preferred stock.

We may be required to raise additional capital by issuing new securities, which may have terms or rights superior to those of our shares of common stock, which could adversely affect the market price of our shares of common stock and our business.

We will require additional financing to fund research, development and commercialization of our technology, to obtain and maintain patents and other intellectual property rights in our technology, and for working capital and other purposes. We may not be able to obtain financing on favorable terms, if at all. If we raise additional funds by issuing equity securities, the percentage ownership of our then-current shareholders will be reduced. Further, we may have to offer new investors in our equity securities rights that are superior to the holders of common stock, which could adversely affect the market price and the voting power of shares of our common stock. If we raise additional funds by issuing debt securities, the holders of these debt securities would similarly have some rights senior to those of the holders of shares of common stock, and the terms of these debt securities could impose restrictions on operations and create a significant interest expense for us which could have a materially adverse effect on our business and results of operations.

There can be no assurance that we will be able to comply with the continued listing standards of Nasdaq.

On November 24, 2023, we received a notice (the “Notice”) from the Listing Qualifications Department of Nasdaq stating

that the previously announced resignation of Gary DiElsi from the our board of directors resulted in noncompliance with the board of directors independence requirements set forth in Nasdaq Listing Rule 5605(b)(1) and the requirement in Nasdaq Listing Rule 5605(c)(2)(A) to have an audit committee of at least three independent directors.

More specifically, when the Notice was issued, the board of directors did not have a majority of directors who would be considered “independent directors,” as that term is defined in Nasdaq Listing Rule 5605(a)(2) and the audit committee of the board of directors consisted of only two independent directors. Consistent with Nasdaq Listing Rules 5605(b)(1)(A) and Rule 5605(c)(4), Nasdaq has provided us a cure period in order to regain compliance until the earlier of (i) our next annual shareholders’ meeting or November 11, 2024, or (ii) if the next annual shareholders’ meeting is held before May 7, 2024, then we must evidence compliance no later than May 7, 2024.

There can be no assurances that we will be able to regain compliance with Nasdaq’s listing standards or if we do later regain compliance with Nasdaq’s listing standards, will be able to continue to comply with the applicable listing standards. If we are unable to maintain compliance with these Nasdaq requirements, our common stock will be delisted from Nasdaq. If Nasdaq delists our common stock, we could face significant material adverse consequences, including:

- a limited availability of market quotations for our securities;
- a determination that our common stock is a “penny stock” which will require brokers trading in our common stock to adhere to more stringent rules and possibly resulting in a reduced level of trading activity in the secondary trading market for our common stock;
- a limited amount of news and analyst coverage for our company; and
- a decreased ability to issue additional securities or obtain additional financing in the future.

We have not paid dividends in the past and have no immediate plans to pay dividends.

We plan to reinvest all of our earnings, to the extent we have earnings, in order to continue to develop our products, to market our products, to cover operating costs and to otherwise become and remain competitive. We do not plan to pay any cash dividends with respect to our securities in the foreseeable future. We cannot assure you that we would, at any time, generate sufficient surplus cash that would be available for distribution to the holders of our common stock as a dividend.

We have a significant number of options and restricted stock units outstanding and we may issue additional awards in the future to employees, officers, directors, independent contractors and agents. Sales of the underlying shares of common stock could adversely affect the market price of our common stock.

As of December 31, 2023, we had outstanding options for the purchase of 2,759 thousand shares of common stock and 671 thousand shares of outstanding restricted stock units (“RSUs”). Under the ClearSign Technologies Corporation 2021 Equity Incentive Plan and the ClearSign Technologies Corporation 2013 Consultant Stock Plan (collectively, the “Plans”), we have the ability to grant awards of shares, RSU’s or options to purchase shares of our common stock to employees, officers, directors, independent contractors and agents. Furthermore, the Plan provides for increases in the number of shares available for awards based on the terms outlined in such Plan. Certain holders may sell these shares in the public markets from time to time, without limitations on the timing, amount or method of sale. If our stock price rises, the holders may exercise their options and RSUs and sell a large number of shares. This could cause the market price of our common stock to decline.

Our certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for certain disputes between us and our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our certificate of incorporation provides that, with certain limited exceptions, the Court of Chancery of the State of Delaware is the exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of fiduciary duty owed by any director, officer or stockholder;
- any action asserting a claim against us arising under the Delaware General Corporation Law (“DGCL”), or as to which the DGCL confers jurisdiction on the Court of Chancery of the State of Delaware;
- any action arising pursuant to any provision of our bylaws or certificate of incorporation; and

- any action asserting a claim against us or any current or former director, officer or stockholder that is governed by the internal-affairs doctrine.

This provision does not apply to suits brought to enforce a duty or liability created by the Securities Act, the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction. In addition, unless we consent in writing to the selection of an alternative forum, to the fullest extent permitted by law, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause or causes of action arising under the Securities Act, including all causes of action asserted against any defendant to such complaint.

For the avoidance of doubt, this provision is intended to benefit and may be enforced by us, our officers and directors, the underwriters to any offering giving rise to such complaint, and any other professional entity whose profession gives authority to a statement made by that person or entity and who has prepared or certified any part of the documents underlying the offering. However, these choice of forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees. Further, these choice of forum provisions may increase the costs for a stockholder to bring such a claim and may discourage them from doing so.

While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions, and there can be no assurance that such provisions will be enforced by a court in those other jurisdictions. If a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions. For example, the Court of Chancery of the State of Delaware recently determined that the exclusive forum provisions of federal district courts of the United States of America for resolving any complaint asserting a cause of action arising under the Securities Act is not enforceable. We note that investors cannot waive compliance with the federal securities laws and the rules and regulations thereunder.

The rights of our stockholders to take action against our directors and officers are limited.

Our certificate of incorporation provides for indemnification of our directors and officers to the fullest extent authorized or permitted under Delaware law, except to the extent such exemption from liability or limitation thereof is not permitted under the DGCL as the same exists or hereafter may be amended.

Our bylaws obligates us to indemnify each of our directors or officers who is or is threatened to be made a party to or witness in a proceeding by reason of his or her service in those or certain other capacities, to the maximum extent permitted by Delaware law, from and against any claim or liability to which such person may become subject or which such person may incur by reason of his or her status as a present or former director or officer of us or serving in such other capacities. In addition, we may be obligated to reimburse the expenses reasonably incurred by our present and former directors and officers in connection with such proceedings. As a result, we and our stockholders may have more limited rights to recover money damages from our directors and officers than might otherwise exist absent these provisions in our bylaws or that might exist with other companies, which could limit your recourse in the event of actions that are not in our best interests.

We have incurred and will incur significant costs as a result of being a public company that reports to the Securities and Exchange Commission and our management is required to devote substantial time to meet compliance obligations.

As a public company reporting to the Securities and Exchange Commission, we incur significant legal, accounting, investor relations, printing, board compensation, and other expenses that we did not incur as a private company. These costs totaled \$1.3 million in 2023. We are subject to the reporting requirements of the Securities Exchange Act of 1934 and the Sarbanes-Oxley Act of 2002 (with the exception of the requirement of auditor attestation of internal control over financial reporting from which we are currently excluded as a non-accelerated filer company), as well as rules subsequently implemented by the Commission that impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. In addition, there are significant corporate governance and executive compensation-related provisions in the Dodd-Frank Wall Street Reform and Protection Act that as we grow could increase our legal and financial compliance costs, make some activities more difficult, time-consuming or costly and may also place undue strain on our personnel, systems and resources. Our management and other personnel continually devote a substantial amount of time to these compliance initiatives. Furthermore, these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified people to serve on our board of directors, our board committees or as executive officers.

clirSPV LLC has substantial influence in our ability to enter into corporate transactions, and if clirSPV LLC decides to sell or otherwise transfer their shares of common stock, it may put downward pressure on the trading price of our common stock.

The interests of clirSPV and its affiliates, which include our director Robert T. Hoffman, could conflict with or differ from our interests or the interests of our other shareholders. Further, clirSPV may choose to sell or otherwise transfer a large number of shares of our common stock, which may put downward pressure on the trading price of shares of our common stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS.

None.

ITEM 1C. CYBERSECURITY.

We recognize the critical importance of developing, implementing, and maintaining robust cybersecurity measures to safeguard our information systems and protect the confidentiality, integrity, and availability of our data.

Governance

The audit committee oversees risks related to cybersecurity, including the security of corporate information and the steps management is taking to monitor and control these risks. Management regularly briefs the audit committee on our cybersecurity risk profile, potential threats, and continuous improvement initiatives. Our approach to managing cybersecurity risks is part of a continuous improvement process, both in the context of cybersecurity and broader operational risk management. This ongoing process, which includes employee training, is aimed at routinely reviewing and, as necessary, enhancing our oversight processes and tools to ensure they remain effective and resilient in their management of cybersecurity risk.

Risk Management and Strategy

We engage a third-party Managed Service Provider (MSP) to implement technology infrastructure and oversee its tactical operations. Our MSP employs multiple people with experience in technical leadership, system architecture, network infrastructure and cybersecurity. We believe using an MSP provides economies of scale for a smaller-sized company such as ours, by allowing us access to a broad range of experience and tool sets that would otherwise be difficult to acquire in-house. Our MSP uses specialized third-party services and tool sets for identifying, protecting against, and detecting cyber incidents. Through these services and tools, our detection capabilities include, but are not limited to, near real-time monitoring, intrusion detection systems, and advanced analytics to identify abnormal patterns of behavior. These third-party detection tools provide near real-time alerts, log aggregation, and threat intelligence feeds.

In addition, we engage cybersecurity consultants, unaffiliated with our MSP, to advise management, assess our technology tools and review our cybersecurity practices. Our consultants utilize the National Institute of Standards and Technology (NIST) Cybersecurity Framework to assess our cybersecurity risk and governance practices. The NIST Cybersecurity Framework enables organizations, regardless of size, to apply principles and best practices of risk management to improve security and resilience.

Material Impact of Cybersecurity Threats

While to date we are not aware of any material information security breaches and have not incurred significant operating expenses related to information security breaches, we acknowledge the persistent and evolving nature of these threats, which have the potential to materially impact our business strategy, operations, and financial standing adversely. See Item 1A, "Risk Factors" under the risks related to our business section for more information. Our incident response practices require incident assessments to be conducted in concert with our CEO, CFO and MSP. This enables faster response and effective communication, including public disclosure if a material cybersecurity event were to occur.

ITEM 2. PROPERTIES.

Our principal office is located at 8023 East 63rd Place, Suite 101 Tulsa, Oklahoma 74133 with satellite offices located in Seattle and Beijing, China. At our principal office in Tulsa, we lease 3,922 square feet of office space, under a lease which expires in September 2027. Monthly minimum rent is approximately \$5 thousand with an annual 2.0% increase. The Company also sub-leases 940 square feet of office space located in Seattle, Washington and 656 square feet in Beijing, China. The minimum monthly rent for our Seattle location is approximately \$2 thousand with a termination date of September 30, 2024. The term of the Beijing lease began on June 1, 2023 and expires in June 2024. The monthly minimum rent for our Beijing location is approximately \$2 thousand (20,000RMB).

ITEM 3. LEGAL PROCEEDINGS.

From time to time we may become involved in various lawsuits and legal proceedings which arise in the ordinary course of business. Litigation is subject to inherent uncertainties and an adverse result in any such matter may harm our business. As of the date of this report, we are not a party to any material pending legal proceedings.

ITEM 4. MINE SAFETY DISCLOSURES.

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES.

Our common stock is listed on the Nasdaq Capital Market under the symbol "CLIR".

According to our transfer agent, as of March 21, 2024 we had 289 shareholders of record. This number does not include an indeterminate number of holders whose shares are held by brokers in street name. Our stock transfer agent is VStock Transfer, LLC, 18 Lafayette Place, Woodmere, NY 11598.

Recent Issuances of Unregistered Securities

On December 31, 2023, we issued 3.8 thousand shares of common stock, having a weighted average per share value of \$0.76 from our 2013 Consultant Stock Plan to our investor relations firm, Firm IR Group, LLC, for services provided in the three months ended December 31, 2023. We relied on Section 4(a)(2) of the Securities Act of 1933, as amended, and Regulation D promulgated thereunder to issue the stock.

Equity Compensation Plan Information

See Item 12, Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters, for information about our equity compensation plans.

Dividend Policy

We have not paid any cash dividends on our common stock to date. The payment of cash dividends in the future is dependent upon our revenues and earnings, if any, capital requirements, the terms of any indebtedness and general financial condition. The payment of any cash dividends will be within the discretion of the board at such time. In addition, the board is not currently contemplating and does not anticipate declaring any stock dividends in the foreseeable future.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the audited consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. In addition to historical information, this discussion and analysis here and throughout this Form 10-K contains forward-looking statements that involve risks, uncertainties and assumptions. Our actual results may differ materially from those anticipated in these forward-looking statements due to a number of factors, including but not limited to, the risks described in the section titled "Risk Factors".

Overview

We design and develop technologies for the purpose of improving key performance characteristics of combustion systems, including emission and operational performance, energy efficiency and overall cost-effectiveness. Our ClearSign Core™ technology has been proven in full scale industrial test furnaces and boilers and first customer installations are currently operating in normal commercial applications. We have generated nominal revenues from operations to date to meet operating expenses.

We have incurred losses since inception totaling \$93.7 million and we expect to experience operating losses and negative cash flow for the foreseeable future. We have historically financed our operations primarily through issuances of equity securities. Since inception, we have raised approximately \$91.0 million in gross proceeds through the sale of our equity securities. We may need to raise additional capital in the future, however, the significant volatility in the capital markets may negatively affect our ability to raise this additional capital.

In order to generate meaningful revenues, our technologies must gain market recognition and acceptance to develop sufficient recurring sales. In addition, management believes that the successful growth and operation of our business is dependent upon our ability to obtain adequate sources of funding through co-development agreements, strategic partnering agreements, or equity or debt financing to support commercialization of our research and development efforts, protect intellectual property, form relationships with strategic partners and provide for working capital and general corporate purposes. There can be no assurance that we will be successful in achieving our long-term plans, or that such plans, if consummated, will result in profitable operations or enable us to continue in the long-term as a going concern.

With respect to our China operations, we have a satellite office located in Beijing, China to support our commercialization efforts. At this time, these operations in China are immaterial compared to total company operations. As of December 31, 2023, our China asset balance totaled \$334 thousand, or approximately 4%, compared to our total asset balance of \$7,620 thousand. During the years ended December 31, 2023, and 2022, our China operations reported zero revenues.

Our costs include employee salaries and benefits, compensation paid to consultants, materials and supplies for prototype development and manufacture, costs associated with development activities including materials, sub-contractors, travel and administration, legal and accounting expenses, sales and marketing costs, general and administrative expenses, and other costs associated with an early stage, publicly traded technology company. We currently have 15 full-time employees. Because using third party expertise and resources is more efficient than maintaining full time resources, we also expect to incur ongoing consulting expenses related to technology development and some administrative, sales and legal functions commensurate with our current level of activities.

The amount that we spend for any specific purpose may vary significantly, and could depend on a number of factors including, but not limited to, the pace of progress of our commercialization and development efforts, actual needs with respect to product testing, development and research, market conditions, and changes in or revisions to our sales and marketing strategies.

Research, development, and commercial acceptance of new technologies are, by their nature, unpredictable. Although we undertake development and commercialization efforts with reasonable diligence, there can be no assurance that the net proceeds from our securities offerings will be sufficient to enable us to develop our technology to the extent needed to create sufficient future sales to sustain operations. If the net proceeds from these offerings are insufficient for this purpose, we will consider other options to continue our path to commercialization, including, but not limited to, additional financing through follow-on equity offerings, debt financing, co-development agreements, sale or licensing of developed intellectual or other property, or other alternatives.

We cannot assure that our technologies will be accepted, that we will ever earn revenues sufficient to support our operations, or that we will ever be profitable. Furthermore, we have no committed source of financing, and we cannot be assured that we will be able to raise money as and when we need it to continue our operations. If we cannot raise funds as and when we need them, we may be required to scale back our development by reducing expenditures for employees, consultants, business development and marketing efforts or to otherwise severely curtail, or even to cease, our operations.

Recent Developments

Letter of Intent for Four ClearSign Core™ (Rogue) Boilers

On February 21, 2024, we announced that our collaborative partner California Boiler, received a letter of intent for four boilers to be fitted with the ClearSign Core™ (Rogue) burners as well as the purchase order for the first boiler burner of the series, and has in turn placed their order with ClearSign for the first burner. This purchase order relates to an end customer that is a fruit and vegetable multi-juice processing company located in California's Central Valley. The additional burner orders will be issued concurrent with the construction of additional planned fruit processing lines of the customer.

ATM Suspension

On March 18, 2024, we filed a prospectus supplement suspending the sales of common stock under our At-the-Market ("ATM") program pursuant to that certain Sales Agreement between us and Virtu Americas LLC, as sales agent, dated December 23, 2020 (the "Sales Agreement"). We will not make any sales of our shares of common stock pursuant to the Sales Agreement unless and until a new prospectus supplement is filed with the SEC; however, the Sales Agreement remains in full force and effect.

Critical Accounting Policies

The following discussion and analysis of financial condition and results of operations is based upon our financial statements, which have been prepared in conformity with accounting principles generally accepted in the United States of America. Certain accounting policies and estimates are particularly important to the understanding of our financial position and results of operations. These policies and estimates require the application of significant judgment by management. These estimates can be materially affected by changes from period to period as economic factors and conditions outside of our control change. As a result, they are subject to an inherent degree of uncertainty. In applying these policies, our management uses their judgment to determine the appropriate assumptions to be used in the determination of certain estimates. Those estimates are based on our historical operations, our future business plans and projected financial results, the terms of existing contracts, our observance of trends in the industry, information provided by our customers and information available from other outside sources, as appropriate. See Note 2 to our audited condensed consolidated financial statements included elsewhere in this report for a more complete description of our significant accounting policies.

Revenue Recognition and Cost of Goods Sold.

The Company recognizes revenue and related cost of goods sold in accordance with FASB ASC 606 *Revenue from Contracts with Customers* (ASC 606). Revenues and cost of goods sold are recognized once the goods or services are delivered to the customer's control or non-refundable performance obligations are satisfied. The Company's contracts with customers generally have performance obligations and a schedule of non-refundable cancellation obligations. The contracts generally will be fully performed upon delivery of certain documents or equipment. Revenue related to the contracts is recognized following the completion of non-refundable performance obligations as defined in the contract.

The Company's contracts generally include progress payments from customers upon completion of defined milestones. As these payments are received, they are offset against accumulated project costs and recorded as either contract assets or contract liabilities. Upon completion of the performance obligations and collectability is determined, revenue can be recorded. For any contract in connection with which the Company is expected to incur costs in excess of the contract price, the Company accrues the estimated loss in full in the period such determination is made.

Impairment of Long-Lived Assets

The Company tests long-lived assets, consisting of fixed assets, patents, and other intangible assets, for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable through the estimated undiscounted cash flows expected from the use and eventual disposition of the assets. In the event an asset is not fully recoverable a loss is recognized based on the amount by which the carrying amount exceeds the fair value of the long-lived assets. Fair value is determined based on the present value of estimated expected cash flows using a discount rate commensurate with the risks involved, quoted market prices, or appraised values depending upon the nature of the assets. Losses on long-lived assets to be disposed of are determined in a similar manner, except those fair values are reduced for the cost of disposal.

Product Warranties

The Company warrants all installed products against defects in materials and workmanship, and shortcomings in performance compared to contractual guarantees for a period specified in each contract. Accruals for product warranties are based on expected warranty experience and current product performance trends which are recorded as a component of cost of sales at the time revenue is recognized. The warranty liabilities are reduced by material and labor costs during the warranty period in the periods in which the costs are incurred. The Company periodically assesses the adequacy of our recorded warranty liabilities and adjusts the amounts as necessary, and such adjustments could be material if estimates differ significantly from actual warranty expense. The warranty liabilities are included in accounts payable and accrued liabilities in the audited condensed consolidated balance sheets.

Research and Development

The cost of research and development is expensed as incurred. Research and development costs consist of salaries, benefits, share based compensation, consumables, and consulting fees, including costs to develop and test prototype equipment and parts. Research and development costs are offset by any funds received from strategic partners in cost sharing, collaborative projects. During the year

ended December 31, 2023, the Company received \$60 thousand from such arrangements. During the year ended December 31, 2022, the Company received no monies from strategic partners.

Stock-Based Compensation

The costs of all employee stock options, as well as other equity-based compensation arrangements, are reflected in the audited, condensed consolidated financial statements based on the estimated fair value of the awards on the grant date. That cost is recognized over the period during which an employee is required to provide service in exchange for the award, or in the case of performance options, expense is recognized upon completion of a milestone as defined in the grant agreement. Stock-based compensation for stock grants to non-employees is determined as the fair value of the consideration received or the fair value of equity instruments issued, whichever is more reliably measured.

Fair Value of Financial Instruments

The Company's financial instruments primarily consist of cash equivalents, accounts payable, accrued expenses and short-term investments in government securities. As of the balance sheet date, the estimated fair values of the financial instruments were not materially different from their carrying values as presented on the consolidated balance sheets. This is primarily attributed to the short maturities of these instruments.

Results of Operations

Comparison of the Years Ended December 31, 2023 and 2022

Highlights of our annual financial performance are as follows:

(in thousands, except per share data)	For the Year Ended			
	December 31,		\$ Change	% Change
	2023	2022		
Revenues	\$ 2,403	\$ 374	\$ 2,029	542.6 %
Cost of goods sold	1,586	258	\$ 1,328	514.8 %
Gross profit	817	116	\$ 701	604.4 %
Research and development	739	505	\$ 234	46.4 %
General and administrative	6,059	5,728	\$ 331	5.8 %
Operating Expenses	6,798	6,233	\$ 565	9.1 %
Other income	787	359	\$ 428	119.3 %
Net loss	\$ (5,194)	\$ (5,758)	\$ 564	9.8 %
Basic and diluted net income per common share	\$ (0.13)	\$ (0.16)	\$ 0.03	18.8 %

Revenues and Gross Profit

Consolidated revenues for the year ended December 31, 2023 totaled \$2,403 thousand, compared to \$374 thousand for the same period in 2022. During the three months ended December 31, 2023, we recognized \$1,274 thousand of revenues for a shipment of process burners to a California refinery customer. This shipment supplied burners for one of the two heaters associated with such customer order. Revenues for the year ended December 31, 2023 were generated from orders related to both our product lines, process burners and boiler burners, with the predominate amount of revenues generated from our process burner product line. Revenues for the year ended December 31, 2022 were generated predominantly from the closeout of our ExxonMobil technology validation project.

Gross profit for the year ended December 31, 2023, increased by \$701 thousand compared to gross profit reported for the year ended December 31, 2022. For the year ended December 31, 2023, gross profit was approximately 34.0% of revenues, resulting in an increase in gross profit margin of approximately 2.9% compared to the same period in 2022. The gross profit increase in 2023 was due to increased product shipments and burner performance tests for our customers in California, whereas in 2022 our gross profit was predominately generated by a technology validation project. The change in gross profit margin is a result of the lower margin profile for the technology validation project compared to a typical production order due to cost overruns.

Operating Expenses

Operating expenses consist of research and development (“R&D”) and general and administrative (“G&A”) expenses. These are addressed separately below.

Research and Development

R&D expenses for the year ended December 31, 2023 increased by \$234 thousand, or 46.4%, when compared to the same period in 2022. This year-over-year difference in R&D expenses is primarily due to expenses related to the hiring of our new Chief Technology Officer, which was comprised of a non-cash, non-recurring expense for the vesting of \$43 thousand in inducement stock options, and \$40 thousand human capital costs. We also incurred \$60 thousand burner development costs during the year ended December 31, 2023, primarily due to our hydrogen burner project. The hydrogen burner development project costs are offset by government assistance monies (refer to the “Other Income” note below for further details).

General and Administrative

During the year ended December 31, 2023, G&A expenses increased by \$331 thousand, or 5.8%, when compared to the same period in 2022. This year-over-year difference in G&A expenses is primarily due to an increase of \$172 thousand for a non-cash, non-recurring expense for the vesting of restricted stock units triggered by the departure of a member of our board directors, and \$81 thousand for the non-cash, non-recurring impairment of demonstration burners. These demonstration burners were intended to showcase our burner catalog in operation to potential customers as part of a marketing campaign. These specific burners showcased an older design that we have chosen to retire from our demonstration marketing campaign.

Other Income

During the year ended December 31, 2023, other income increased by \$428 thousand or 119.3%, compared to the same time period in 2022. During the year ended December 31, 2023, interest income from our money market account and short-term investments increased by \$241 thousand compared to same period in 2022 due to rising interest rates and timing of year-over-year cash balances. During the year ended December 31, 2023, other income increased by \$197 thousand compared to same period in 2022 predominately due to our Seattle office decommission project, which focused on selling used equipment and materials. During the year ended December 31, 2023, asset sales decreased by \$33 thousand compared to the same period in 2022 strictly due to timing and prioritization of asset sales during our Seattle office decommissioning project.

Net Loss

Net loss for the year ended December 31, 2023, was \$5,194 thousand as compared to \$5,758 thousand for the same period in 2022, or an approximate 9.8% decrease. The \$564 thousand decrease in net loss is primarily attributable to the \$701 thousand increase in gross profit referenced in the above explanation.

Liquidity and Capital Resources

At December 31, 2023, our cash and cash equivalent balance totaled \$5,684 thousand compared to \$6,451 thousand at December 31, 2022, a decrease of \$767 thousand. The decrease in cash and cash equivalent balance is primarily attributable to our net loss of \$5,194 thousand, which was offset by a decrease in short-term held-to-maturity investments of \$2,606 thousand due to working capital needs and an increase in contract liabilities of \$869 thousand, representing payments from customers in advance of future project costs.

At December 31, 2023, our current assets were in excess of current liabilities resulting in working capital of \$4,253 thousand as compared to \$8,586 thousand at December 31, 2022. We have no contractual debt obligations, and we have historically funded operations predominantly through equity offerings. To the extent we require additional funds more than 12 months from the date hereof, and customer cash collections cannot fund our needs, we may need to utilize additional equity offerings to raise these funds. As of the date of this report, we do not have sufficient working capital to fund our operating expenses for the next 12 months. However, we are contemplating a capital raise through a public offering pursuant to our Form S-3 shelf registration statement in April 2024, and we expect that, to the extent this public offering is consummated, we will not need additional equity capital for a period of 12 months or more following this public offering. During the year ended December 31, 2023, working capital was funded predominately through customer cash collections for payment milestones outlined in our customer contracts.

The Form S-3 shelf registration statement filed with the SEC on July 1, 2022 was declared effective on August 12, 2022. The registration statement on Form S-3 allows us to offer common stock, preferred stock, warrants, subscription rights, debt securities and units from time to time, as market conditions permit to fund, to the extent required beyond the 12 months from the date hereof, the ongoing operations of the Company. Until the growth of revenue increases to a level that covers operating expenses, the Company intends to continue to fund operations in this manner, although the volatility in the capital markets may negatively affect our ability to do so.

Operating activities for the year ended December 31, 2023 resulted in cash outflows of \$3,233 thousand, primarily due to the loss for the period of \$5,194 thousand, offset with non-cash expenses of \$1,045 thousand, and an increase of \$869 thousand of contract liabilities, which represents payments from customers in advance of future project costs. Operating activities for the year ended December 31, 2022 resulted in cash outflows of \$4,992 thousand, primarily due to the loss for the period of \$5,758 thousand, offset with non-cash expenses of \$627 thousand.

Investing activities for the year ended December 31, 2023 resulted in cash inflows of \$2,490 thousand, which is primarily attributable to the redemption \$4,847 thousand of short-term held-to-maturity U.S. treasuries, offset by \$2,162 thousand of purchases for the same type of investments. Investing activities for the year ended December 31, 2022 resulted in cash outflows of \$2,686 thousand, which is primarily attributable to the redemption \$3,337 thousand of short-term held-to-maturity U.S. treasuries, offset by \$5,898 thousand of purchases for the same type of investments.

Financing activities for the year ended December 31, 2023 included \$15 thousand in disbursements for taxes paid related to vesting of employee restricted stock units. Financing activities for the year ended December 31, 2022 included \$6,539 thousand in net proceeds from the sale of 501 thousand shares of our common stock through our ATM program at an average price of \$1.24 per share, sale of 4.2 million shares of our common stock through a public offering at an average price of \$1.11 per share, and sales of 1.6 million shares of our common stock at a price of \$1.11 per share pursuant to the Participant Right with clirSPV.

Off-Balance Sheet Transactions

We do not have any off-balance sheet transactions.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As a smaller reporting company, we are not required to provide this information.

ITEM 8. CONSOLIDATED FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Please see the financial statements beginning on page F-1 located in this Annual Report on Form 10-K and incorporated herein by reference.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act that are designed to reasonably ensure that information required to be disclosed in our reports filed under the Exchange Act, is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms, and that such information is accumulated and communicated to our management, including our principal executive officer and principal accounting and financial officer, as appropriate, to allow timely decisions regarding required disclosure.

We carried out an evaluation under the supervision and with the participation of management, including our Chief Executive Officer (principal executive officer) and our Chief Financial Officer (principal accounting and financial officer), of the effectiveness of the design and operation of our disclosure controls and procedures as of December 31, 2023, the end of the period covered by this Annual Report on Form 10-K. Based upon the evaluation of our disclosure controls and procedures as of December 31, 2023, our Chief Executive Officer (principal executive officer) and our Chief Financial Officer (principal accounting and financial officer) concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management’s Report on Internal Control over Financial Reporting

Our Chief Executive Officer (principal executive officer) and our Chief Financial Officer (principal accounting and financial officer) are responsible for establishing and maintaining internal control over financial reporting. Internal control over financial reporting is defined in Rule 13a-15(f) and 15d-15(f) promulgated under the Act as a process designed by, or under the supervision of, our principal executive and principal financial officers and effected by our board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of management and our directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Because of its inherent limitations, our internal control over financial reporting may not prevent or detect misstatements. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2023. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control – Integrated Framework (2013 Framework). Based on this assessment, our management, with the participation of our Chief Executive Officer (principal executive officer) and our Chief Financial Officer (principal accounting and financial officer), has concluded that, as of December 31, 2023, our internal control over financial reporting was effective based on those criteria.

Changes in Internal Control over Financial Reporting

There have been no changes in the Company’s internal control over financial reporting that have materially affected, or that are reasonably likely to materially affect, the Company’s internal control over financial reporting.

ITEM 9B. OTHER INFORMATION.

None of the Company’s directors or officers adopted, modified or terminated a Rule 10b5-1 trading arrangement or a non-Rule 10b5-1 trading arrangement during the Company’s fiscal quarter ended December 31, 2023, as such terms are defined under Item 408(a) of Regulation S-K.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS.

Not applicable

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.

Incorporated by reference from our Proxy Statement for our 2024 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2023.

Code of Business Conduct and Ethics

The Company has adopted a Code of Business Conduct and Ethics that applies to all of our ClearSign employees and directors. The Code of Business Conduct and Ethics is posted on the Company's website at www.clearsign.com. We will post any amendments to or waivers from the Code of Business Conduct and Ethics at that location. We have also adopted Governance Guidelines for the board of directors and a written committee charter for each of our audit committee and compensation committee.

ITEM 11. EXECUTIVE COMPENSATION.

Incorporated by reference from our Proxy Statement for our 2024 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2023.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED SHAREHOLDER MATTERS.

Incorporated by reference from our Proxy Statement for our 2024 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2023.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE.

Incorporated by reference from our Proxy Statement for our 2024 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2023.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

Incorporated by reference from our Proxy Statement for our 2024 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2023.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES.

(a) (1) Consolidated Financial Statements

The financial statements filed as part of this report are listed and indexed in the Index to Consolidated Financial Statements on page 31 located in this Annual Report on Form 10-K. Financial statement schedules have been omitted because they are not applicable, or the required information has been included elsewhere in this report.

(a) (2) Financial Statement Schedules

Not applicable.

(a) (3) Exhibits

The exhibits filed as part of this Annual Report on Form 10-K are listed in the Exhibit Table below. The Company has identified in the Exhibit Table each management contract and compensation plan filed as an exhibit to this Annual Report on Form 10-K in response to Item 15(a) (3) of Form 10-K.

(b) The exhibits set forth in the following index of exhibits are filed or incorporated by reference as a part of this Annual Report on Form 10-K:

ITEM 16. FORM 10-K SUMMARY.

None.

ClearSign Technologies Corporation

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of
ClearSign Technologies Corporation and Subsidiary

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of ClearSign Technologies Corporation and subsidiary (the "Company") as of December 31, 2023 and 2022, and the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows, for each of the two years in the period ended December 31, 2023, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2023, in conformity with accounting principles generally accepted in the United States of America.

Going Concern

The accompanying financial statements have been prepared assuming that the entity will continue as a going concern. As discussed in Note 1 to the financial statements, the entity has suffered recurring losses from operations and has a net capital deficiency that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audit. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audit included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audit provides a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of this critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the account or disclosures to which it relates.

Carrying Cost of Patents and Other Intangible Assets

As described in Notes 2 and 4 to the consolidated financial statements, the Company's patents and other intangible assets, net balance was \$0.8 million as of December 31, 2023. The Company capitalizes third-party legal costs and filing fees, if any, associated with obtaining patents or other intangible assets. Once a patent asset has been placed in service, the Company amortizes these costs over the shorter of the asset's legal or estimated economic life using the straight-line method. The Company also evaluates for potential impairment of long-lived assets, including intangible assets composed of patents, no less frequently than annually or whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable.

The principal considerations for our determination that performing procedures relating to the carrying value of intangible assets is a critical audit matter are the significant amount of judgment by management in developing the assumptions of future economic benefit in an impairment analysis, which in turn led to significant auditor judgment, subjectivity and effort in performing audit procedures and evaluating audit evidence relating to the analysis.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included, among others, reviewing current and forecasted operating conditions for indication of impairment. We also reviewed board minutes, news, and industry reports for indications of impairment. Last, we obtained an understanding of potential future customers indicating future recoverability.

/s/ BPM CPA LLP

Santa Monica, California

March 29, 2024

We have served as the Company's auditor since 2011.

ClearSign Technologies Corporation
Consolidated Balance Sheets

(in thousands, except share and per share data)

	December 31,	
	2023	2022
<u>ASSETS</u>		
Current Assets:		
Cash and cash equivalents	\$ 5,684	\$ 6,451
Short-term held-to-maturity investments	—	2,606
Accounts receivable, net	287	79
Contract assets	188	20
Prepaid expenses and other assets	350	577
Total current assets	<u>6,509</u>	<u>9,733</u>
Fixed assets, net	275	384
Patents and other intangible assets, net	836	798
Other assets	—	10
Total Assets	<u>\$ 7,620</u>	<u>\$ 10,925</u>
<u>LIABILITIES AND EQUITY</u>		
Current Liabilities:		
Accounts payable and accrued liabilities	\$ 366	\$ 296
Current portion of lease liabilities	71	133
Accrued compensation and related taxes	703	471
Contract liabilities	1,116	247
Total current liabilities	<u>2,256</u>	<u>1,147</u>
Long Term Liabilities:		
Long term lease liabilities	172	226
Total liabilities	<u>2,428</u>	<u>1,373</u>
Commitments and contingencies (Note 10)		
Stockholders' Equity:		
Preferred stock, \$0.0001 par value, zero shares issued and outstanding	—	—
Common stock, \$0.0001 par value, 38,687,061 and 38,023,701 shares issued and outstanding at December 31, 2023 and December 31, 2022, respectively	4	4
Additional paid-in capital	98,922	98,079
Accumulated other comprehensive loss	(17)	(8)
Accumulated deficit	(93,717)	(88,523)
Total equity	<u>5,192</u>	<u>9,552</u>
Total Liabilities and Equity	<u>\$ 7,620</u>	<u>\$ 10,925</u>

The accompanying notes are an integral part of these consolidated financial statements.

ClearSign Technologies Corporation
Consolidated Statements of Operations and Comprehensive Loss

(in thousands, except share and per share data)

	For the Year Ended December 31,	
	2023	2022
Revenues	\$ 2,403	\$ 374
Cost of goods sold	1,586	258
Gross profit	817	116
Operating expenses:		
Research and development	739	505
General and administrative	6,059	5,728
Total operating expenses	6,798	6,233
Loss from operations	(5,981)	(6,117)
Other income		
Interest	324	83
Government assistance	255	232
Gain from sale of assets	5	38
Other income, net	203	6
Total other income	787	359
Net loss	<u>\$ (5,194)</u>	<u>\$ (5,758)</u>
Net loss per share - basic and fully diluted	<u>\$ (0.13)</u>	<u>\$ (0.16)</u>
Weighted average number of shares outstanding - basic and fully diluted	<u>38,500,933</u>	<u>35,338,712</u>
Comprehensive loss		
Net loss	\$ (5,194)	\$ (5,758)
Foreign-exchange translation adjustments	(9)	(17)
Comprehensive loss	<u>\$ (5,203)</u>	<u>\$ (5,775)</u>

The accompanying notes are an integral part of these consolidated financial statements.

ClearSign Technologies Corporation
Consolidated Statement of Stockholders' Equity
For the Year Ended December 31, 2023

(in thousands, except per share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total ClearSign Technologies Corp. Stockholders' Equity
	Shares	Amount				
Balances at December 31, 2022	38,023	\$ 4	\$ 98,079	\$ (8)	\$ (88,523)	\$ 9,552
Share-based compensation, net of taxes paid	339	—	599	—	—	599
Fair value of stock issued in payment of accrued compensation	296	—	234	—	—	234
Shares issued for services (\$0.66 per share)	12	—	7	—	—	7
Shares issued upon exercise of options (\$0.54 per share)	12	—	—	—	—	—
Shares issued for services (\$0.81 per share)	3	—	3	—	—	3
Shares issued upon exercise of options (\$1.31 per share)	2	—	—	—	—	—
Foreign-exchange translation adjustment	—	—	—	(9)	—	(9)
Net loss	—	—	—	—	(5,194)	(5,194)
Balances at December 31, 2023	38,687	\$ 4	\$ 98,922	\$ (17)	\$ (93,717)	\$ 5,192

ClearSign Technologies Corporation
Consolidated Statement of Stockholders' Equity
For the Year Ended December 31, 2022

(in thousands, except per share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total ClearSign Technologies Corp. Stockholders' Equity
	Shares	Amount				
Balances at December 31, 2021	31,582	\$ 3	\$ 91,035	\$ 9	\$ (82,765)	\$ 8,282
Shares issued upon exercise of options (\$0.89 per share)	11	—	—	—	—	—
Shares issued upon exercise of options (\$2.93 per share)	3	—	—	—	—	—
Fair value of stock issued in payment of accrued compensation	66	—	95	—	—	95
Fair value of stock options granted in payment of accrued compensation	—	—	12	—	—	12
Share based compensation	67	—	373	—	—	373
Shares issued through the use of At-The Market issuance (\$1.24 average per share)	501	—	587	—	—	587
Shares issued for services (\$1.93 per share)	13	—	25	—	—	25
Shares issued for services (\$0.66 per share)	2	—	1	—	—	1
Shares issued in stock offering (\$1.11 per share)	4,186	1	4,210	—	—	4,211
Shares issued pursuant to purchase right (\$1.11 per share)	1,592	—	1,741	—	—	1,741
Foreign-exchange translation adjustment	—	—	—	(17)	—	(17)
Net loss	—	—	—	—	(5,758)	(5,758)
Balances at December 31, 2022	38,023	\$ 4	\$ 98,079	\$ (8)	\$ (88,523)	\$ 9,552

The accompanying notes are an integral part of these consolidated financial statements.

ClearSign Technologies Corporation
Consolidated Statements of Cash Flows

(in thousands)

	For the Years Ended December 31,	
	2023	2022
Cash flows from operating activities:		
Net loss	\$ (5,194)	\$ (5,758)
Adjustments to reconcile net loss to net cash used in operating activities:		
Common stock issued for services	10	26
Share-based compensation	614	373
Depreciation and amortization	299	161
Gain from sale of fixed assets	(5)	(38)
Right of use asset amortization	125	131
Realized gain from marketable securities	(79)	(45)
Lease amendments	(14)	—
Impairment of fixed assets	81	—
Impairment of intangible assets	14	19
Change in operating assets and liabilities:		
Contract assets	(168)	19
Accounts receivable	(208)	(46)
Prepaid expenses and other assets	18	(232)
Other long term assets	10	—
Accounts payable and accrued liabilities	(57)	(125)
Accrued compensation and related taxes	452	360
Contract liabilities	869	163
Net cash used in operating activities	<u>(3,233)</u>	<u>(4,992)</u>
Cash flows from investing activities:		
Acquisition of fixed assets	—	(10)
Disbursements for patents and other intangible assets	(200)	(154)
Proceeds from sale of fixed assets	5	39
Purchases of held-to-maturity short-term U.S. treasuries	(2,162)	(5,898)
Redemption of held-to-maturity short-term U.S. treasuries	4,847	3,337
Net cash provided by (used in) investing activities	<u>2,490</u>	<u>(2,686)</u>
Cash flows from financing activities:		
Proceeds from issuance of common stock, net of offering costs	—	6,539
Taxes paid related to vesting of restricted stock units	(15)	—
Net cash (used in) provided by financing activities	<u>(15)</u>	<u>6,539</u>
Effect of exchange rate changes on cash and cash equivalents	(9)	(17)
Cash and cash equivalents:		
Net change in cash and cash equivalents	(767)	(1,156)
Cash and cash equivalents, beginning of year	6,451	7,607
Cash and cash equivalents, end of year	<u>\$ 5,684</u>	<u>\$ 6,451</u>
Supplemental disclosure of cash flow information:		
Officer and employee equity awards for prior year accrued compensation	\$ 234	\$ 107
Prior year prepaid expenses repurposed to fixed assets as demonstration equipment	\$ 209	\$ —
Non-cash impact of new lease	\$ 34	\$ —

The accompanying notes are an integral part of these consolidated financial statements.

ClearSign Technologies Corporation
Notes to Consolidated Financial Statements

Note 1 – Organization and Description of Business

ClearSign Technologies Corporation (“ClearSign” or the “Company”) designs and develops products and technologies that have been shown to significantly improve key performance characteristics of industrial and commercial systems, including operational performance, energy efficiency, emission reduction, safety, and overall cost-effectiveness. The Company’s patented technologies are designed to be embedded in established OEM products as ClearSign Core™ and ClearSign Eye™ and other sensing configurations in order to enhance the performance of combustion systems and fuel safety systems in a broad range of markets. These markets include energy (upstream oil production and down-stream refining), commercial/industrial boiler, chemical, petrochemical, transport and power industries. The Company’s primary technology is its ClearSign Core technology, which achieves very low emissions without the need of selective catalytic reduction.

The Company was originally incorporated in the State of Washington in 2008. During January 2022, the Company relocated its headquarters from Seattle, Washington to Tulsa, Oklahoma. Effective June 15, 2023, the Company changed its state of incorporation to Delaware. On July 28, 2017, the Company incorporated a subsidiary, ClearSign Asia Limited, in Hong Kong to represent the Company’s business and technological interests throughout Asia. Through ClearSign Asia Limited, the Company has established a Wholly Foreign Owned Enterprise (WFOE) in China – ClearSign Combustion (Beijing) Environmental Technologies Co., LTD.

Unless otherwise stated or the context otherwise requires, the terms ClearSign and the Company refer to ClearSign Technologies Corporation and its subsidiary, ClearSign Asia Limited.

Liquidity

The Company's consolidated financial statements have been presented on the basis that it is a going concern, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. As of December 31, 2023, the Company’s cash and cash equivalents totaled \$5,684 thousand, which is not sufficient to fund current operating expenses beyond twelve months from the date hereof. The Company’s technologies are currently in field development, but with nominal fully operational commercial installations, and have generated nominal revenues from operations to date to meet operating expenses. In order to generate meaningful revenues, the technologies must be fully developed, gain market recognition and acceptance, and develop a critical level of successful sales and product installations. These factors raise substantial doubt about the Company’s ability to continue as a going concern for the twelve months from the date of this report.

Historically, the Company has financed operations primarily through issuances of equity securities. Since inception, the Company has raised approximately \$91.0 million in gross proceeds through the sale of its equity securities. During the year ended December 31, 2023, the Company did not raise proceeds through the issuance of common stock.

The Company has incurred losses since its inception totaling \$93.7 million and expects to experience operating losses and negative cash flows for the foreseeable future. Management believes that the successful growth and operation of the Company’s business is dependent upon its ability to obtain adequate sources of funding through co-development agreements, strategic partnering agreements, or equity or debt financing to adequately support product commercialization efforts, protect intellectual property, form relationships with strategic partners, and provide for working capital and general corporate purposes. There can be no assurance that the Company will be successful in achieving its long-term plans as set forth above, or that such plans, if consummated, will result in profitable operations or enable the Company to continue in the long-term as a going concern. As a result, the substantial doubt the Company’s ability to continue as a going concern had not been alleviated. The accompanying financial statements do not include any adjustments that might be necessary if the Company is unable to continue as a going concern.

Note 2 – Summary of Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements include the accounts of ClearSign and its subsidiary. Intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Revenue Recognition and Cost of Sales

The Company recognizes revenue and related cost of goods sold in accordance with Financial Accounting Standards Board (“FASB”) Accounting Standards Codification Topic 606 *Revenue from Contracts with Customers* (“ASC 606”). When applying ASC 606, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the promises and performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the performance obligations are satisfied. Revenues and cost of goods sold are recognized once the goods or services are delivered to the customer’s control or non-refundable performance obligations are satisfied. The Company’s contracts with customers generally have performance obligations and a schedule of non-refundable cancellation obligations. The contracts generally will be fully performed upon delivery of certain drawings or equipment. Revenue related to the contracts is recognized following the completion of non-refundable performance obligations as defined in the contract.

The Company’s contracts generally include progress payments from the customer upon completion of defined milestones. As these payments are received, they are offset against accumulated project costs and recorded as either contract assets or contract liabilities. Upon completion of the performance obligations and collectability is determined, revenue is recorded. For any contract that is expected to incur costs in excess of the contract price, the Company accrues the estimated loss in full in the period such determination is made.

Contract Costs

The Company capitalizes project costs until performance obligations related to the contract are completed. The Company expenses selling and marketing expenses when incurred within the statement of operations in general and administrative expenses.

Product Warranties

The Company warrants all installed products against defects in materials and workmanship for a period specified in each contract by replacing failed parts. Accruals for product warranties are based on historical or expected warranty experience and current product performance trends and are recorded as a component of cost of sales at the time revenue is recognized. The warranty liabilities are reduced by material and labor costs used to replace parts over the warranty period in the periods in which the costs are incurred. The Company periodically assesses the adequacy of its recorded warranty liabilities and adjusts the amounts as necessary, and such adjustments could be material in the future if estimates differ significantly from actual warranty expense. Product warranties are included in accounts payable and accrued liabilities in the consolidated balance sheets.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash on deposit in a checking and savings account, and short-term money market instruments with an original maturity of three months or less. Cash equivalents, which consist of short-term US treasury bills, are based on quoted market prices, a Level 1 fair value measure.

Short-Term Investments

Short-term investments consist of U.S. treasuries with original maturities of twelve months or less and greater than three months. These short-term investments are classified as held to maturity and are recorded on an amortized cost basis based on the Company’s positive intent and ability to hold these securities to maturity. As of December 31, 2023, the Company has not experienced any other-than-temporary impairment of its short-term investments. A decline in the market value of any held-to-maturity security below cost that is deemed other than temporary results in a reduction in carrying amount to fair value. The impairment is charged to earnings and a new cost basis for the security is established. The company evaluates whether the decline in fair value of its investments is other-than temporary at each quarter-end.

The cost basis for our short-term investments totaled approximately zero and \$2,606 thousand for the years ended December 31, 2023 and 2022, respectively. The unrealized holding gains for our short-term investments totaled approximately zero and \$4 thousand for

the years ended December 31, 2023 and 2022, respectively. We have not experienced any continuous unrealized holding losses on these investments. The fair value for our short-term investments totaled approximately zero and \$2,610 thousand for the years ended December 31, 2023 and 2022, respectively.

Accounts Receivable and Allowance for Doubtful Accounts

Trade accounts receivable is stated at the cost less a reserve for expected credit losses. The Company performs ongoing credit evaluations of its customers' financial condition and generally requires no collateral from its customers or interest on past due amounts. Management estimates the allowance for credit loss based on review and analysis of specific customer balances that may not be collectible and how recently payments have been received in addition to an expected credit loss model based on aging analysis as per the invoice date as re-imbursement risks could exist. Though an exception exists, the vast majority of the outstanding accounts receivable share the same expected credit risk due to the re-imbursement risk is same for the current customer pool. Accounts are considered for write-off when they become past due and when it is determined that the probability of collection is remote. In accordance with Company policy and based on the Company's historical experience, the Company estimates a reserve due to the nature of uncertainty for collectability of reimbursement. The allowance for collectability reserve as of December 31, 2023, and 2022 was zero, respectively.

Fixed Assets and Leases

Fixed assets are recorded at cost. Leases are recorded in accordance with FASB ASC 842, *Leases*. For those leases with a term greater than one year, the Company recognizes a right-of-use asset, which is included in fixed assets, net on the consolidated balance sheets, and a lease liability measured at the present value of the lease payments at the time of the lease inception or modification. Lease costs are recognized in the consolidated statement of operations over the lease term on a straight-line basis. Leases with a term of 1 year or less are considered short term leases with rent expense recognized over the lease term. Depreciation is computed using the straight-line method over the estimated useful lives of the respective lease assets. Leasehold improvements are depreciated over the life of the lease or their useful life, whichever is shorter. All other fixed assets are depreciated over three to four years. Maintenance and repairs are expensed as incurred.

Patents and Trademarks

Third-party expenses related to patents and trademarks are recorded at cost, less accumulated amortization. Amortization is computed using the straight-line method over the estimated useful lives of the assets once they are awarded. Patent application costs are deferred pending the outcome of patent and trademark applications. Costs associated with unsuccessful patent applications and abandoned intellectual property are expensed when determined to have no continuing value in current business activity. The Company evaluates the recoverability of the carrying values of intangible assets each reporting period.

Impairment of Long-Lived Assets

The Company tests long-lived assets, consisting of fixed assets, patents, trademarks, and other intangible assets, for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable through the estimated undiscounted cash flows expected from the use and eventual disposition of the assets. In the event an asset is not fully recoverable a loss is recognized based on the amount by which the carrying amount exceeds the fair value of the long-lived assets. Fair value is determined based on the present value of estimated expected cash flows using a discount rate commensurate with the risks involved, quoted market prices, or appraised values depending upon the nature of the assets. Losses on long-lived assets to be disposed are determined in a similar manner, except those fair values are reduced for the cost of disposal.

Fair Value of Financial Instruments

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Assets and liabilities measured at fair value are categorized based on whether or not the inputs are observable in the market and the degree that the inputs are observable. The categorization of financial assets and liabilities within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The three levels of inputs used to establish fair value are the following:

- Level 1 – Quoted prices in active markets for identical assets or liabilities.

- Level 2 – Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; and
- Level 3 – Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The Company's financial instruments primarily consist of cash equivalents, short-term investments, accounts receivable, accounts payable, and accrued expenses. As of the balance sheet dates, the estimated fair values of the financial instruments were not materially different from their carrying values as presented on the balance sheets. This is primarily attributable to the short-term nature of these instruments.

The Company did not identify any other recurring or non-recurring assets and liabilities that are required to be presented in the balance sheets at fair value.

Research and Development

The cost of research and development is expensed as incurred. Research and development costs consist of salaries, benefits, share based compensation, consumables, and consulting fees, including costs to develop and test prototype equipment and parts. Research and Development costs have been offset by funds received, if any, from strategic partners in cost sharing, collaborative projects. During the year ended December 31, 2023, the Company received \$60 thousand from these arrangements. During the year ended December 31, 2022, the Company did not receive funds from these arrangements.

Government Assistance

We have adopted Accounting Standards Update ("ASU") 2021-10, Government Assistance (Topic 832) *Disclosures by Business Entities about Government Assistance*, which requires footnote disclosure of assistance received from government entities. We record gross monies received from government entities in other income, and associated expenses such as salaries and supplies are recorded in Research and Development or General and Administration, depending on the nature of expenditure. We accrue for reimbursement requests submitted to government entities in accounts receivable.

Income Taxes

The Company accounts for income taxes using an asset and liability approach which allows for the recognition and measurement of deferred tax assets based upon the likelihood of realization of tax benefits in future years. Under the asset and liability approach, deferred taxes are provided for the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. A valuation allowance is provided for deferred tax assets if it is more likely than not the Company would not be able to realize their benefits, or that future deductibility is uncertain. Tax benefits are recognized only if it is more likely than not that the tax benefits will be utilized in the foreseeable future.

Share-Based Compensation

The costs of all employee stock options, as well as other equity-based compensation arrangements, are reflected in the consolidated financial statements based on the estimated fair value of the awards on the grant date. That cost is recognized over the period during which an employee is required to provide service in exchange for the award, or in the case of performance options, expense is recognized upon completion of a milestone as defined in the grant agreement. Share-based compensation for stock grants to non-employees is determined as the fair value of the consideration received or the fair value of equity instruments issued, whichever is more reliably measured.

Foreign Operations

The accompanying consolidated balance sheets as of December 31, 2023 and 2022 include assets amounting to approximately \$334 thousand and \$172 thousand, respectively, relating to operations of ClearSign Asia Limited. The Beijing registered capital requirement is \$350 thousand, which is required to be paid by 2027, and of which \$111 thousand has been paid as of December 31, 2023. It is always possible that unanticipated events in foreign countries could disrupt the Company's operations, and since the first quarter of 2020, this has been the case with the effects of the COVID-19 pandemic.

Foreign Currency

Assets and liabilities of ClearSign Asia Limited with non-U.S. Dollar functional currency are translated to U.S. Dollars using exchange rates in effect at the end of the period. Revenue and expenses are translated to U.S. Dollars using rates that approximate those in effect during the period. The resulting translation adjustments are included in the Company's consolidated balance sheets in the stockholders' equity section as a component of accumulated other comprehensive (loss).

Net Loss per Common Share

Basic loss per share is computed by dividing loss available to common stockholders by the weighted-average number of common shares outstanding. Diluted loss per share is computed similar to basic loss per share except that the denominator is increased to include additional common shares available upon exercise of stock options and warrants using the treasury stock method, except for periods for which no common share equivalents are included because their effect would be anti-dilutive. At December 31, 2023 and 2022, potentially dilutive shares outstanding amounted to 3.9 million and 3.5 million, respectively.

Recently Issued Accounting Pronouncements

In June 2017, the FASB issued an Accounting Standards Update ("ASU") ASU 2016-13, Financial Instruments (Topic 326) *Measurement of Credit Losses on Financial Instruments*, which requires the measurement and recognition of expected credit losses for financial assets held at amortized cost. The standard replaces the existing incurred loss impairment model with an expected loss methodology, which will result in more timely recognition of credit losses. ASU 2016-13, and related amendments, are effective for fiscal years beginning after December 15, 2022. The Company adopted ASU 2016-13 as of January 1, 2023, and this adoption did not have a material impact on our accounts receivable or short-term investment balances.

Note 3 – Fixed Assets

Fixed Assets

Fixed assets are summarized as follows:

<i>(in thousands)</i>	December 31,	
	2023	2022
Machinery and equipment	\$ —	\$ 390
Office furniture and equipment	60	177
Leasehold improvements	43	192
	103	759
Accumulated depreciation and amortization	(63)	(697)
	40	62
Operating lease ROU assets, net	235	322
Total	\$ 275	\$ 384

Depreciation and amortization expense for the years ended 2023 and 2022 totaled \$152 thousand and \$24 thousand, respectively. In the year ended December 31, 2023, we impaired \$81 thousand of machinery and equipment, specifically demonstration burners. These burners were capitalized at \$209 thousand, and at the time of impairment, the associated accumulated depreciation amounted to \$128 thousand.

Leases

The Company leases office space in Tulsa, Oklahoma, Seattle, Washington and Beijing, China. During June 2023, the Company renewed its Beijing, China lease agreement for 13 months with monthly rent at approximately \$3 thousand. The Company increased the right of use asset and lease liability by \$34 thousand.

During March 2023, the Company amended its Seattle lease to extend the lease term to September 2023. The amended lease reduced the square footage and lowered the monthly payment to approximately \$4 thousand. The Company increased the right of use asset by \$5 thousand and decreased the lease liability by \$9 thousand. During October 2023, the Company entered into a sub-lease agreement to rent office space in Seattle for approximately \$2 thousand per month for twelve months. The Tulsa and Beijing leases are classified as operating leases, with remaining terms ranging from less than twelve months to four years; contractual language requires renewal

negotiations to occur at or near termination. These leases are normal and customary for office space, in that, contractual guarantees exist requiring the lessee return the premises to its original functional state. The Company incurred restoration expenses of \$33 thousand and \$55 thousand for the years ended December 31, 2023 and 2022, respectively.

The Tulsa lease contains fixed annual lease payments that increase annually by 2%. The Seattle, Tulsa, and Beijing total monthly minimum rent is approximately \$10 thousand. Operating lease costs for the years ended December 31, 2023 and 2022 were \$141 thousand and \$186 thousand, respectively.

Supplemental balance sheet information related to operating leases is as follows:

<i>(in thousands)</i>	<u>December 31,</u> 2023	<u>December 31,</u> 2022
Operating lease ROU assets, net	\$ 235	\$ 322
Lease Liabilities:		
Current lease liabilities	\$ 71	\$ 133
Long term lease liabilities	172	226
Total lease liabilities	<u>\$ 243</u>	<u>\$ 359</u>
Weighted average remaining lease term (in years):	2.4	
Weighted average discount rate:	5.2 %	

Supplemental cash flow information related to leases is as follows:

<i>(in thousands)</i>	<u>For the Year Ended</u> <u>December 31,</u>	
	<u>2023</u>	<u>2022</u>
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows used in operating leases	\$ 158	\$ 251
Non-cash impact of new leases and lease modifications		
Change in operating lease liabilities	\$ 25	\$ 25
Change in operating lease ROU assets	\$ 39	\$ —

Minimum future payments under the Company's lease liabilities as of December 31, 2023 are as follows:

<i>(in thousands)</i>	<u>Discounted</u> <u>lease</u> <u>liability</u> <u>payments</u>	<u>Payments</u> <u>due under</u> <u>lease</u> <u>agreements</u>
2024	\$ 71	\$ 81
2025	59	66
2026	63	67
2027	50	51
Total	<u>\$ 243</u>	<u>\$ 265</u>

At December 31, 2023, \$22 thousand of our future minimum lease payments represents interest.

Note 4 – Patents and Other Intangible Assets

Patents and other intangible assets are summarized as follows:

<i>(in thousands)</i>	December 31,	
	2023	2022
Patents		
Patents pending	\$ 477	\$ 307
Issued patents	810	815
	<u>1,287</u>	<u>1,122</u>
Trademarks		
Trademarks pending	4	6
Registered trademarks	86	95
	<u>90</u>	<u>101</u>
Other	8	8
	<u>1,385</u>	<u>1,231</u>
Accumulated amortization	<u>(549)</u>	<u>(433)</u>
	<u>\$ 836</u>	<u>\$ 798</u>

Amortization expense for the years ended December 31, 2023 and 2022 totaled \$147 thousand and \$136 thousand, respectively. Future amortization expense associated with issued patents and registered trademarks as of December 31, 2023 is as follows:

<i>(in thousands)</i>	
2024	\$ 129
2025	99
2026	66
2027	43
2028	7
Thereafter	3
	<u>\$ 347</u>

The amortization life for patents ranges between three to five years, with trademark lives set at ten years. The Company does not amortize patents or trademarks classified as pending.

During the years ended December 31, 2023 and 2022, the Company assessed its patent and trademark assets, and determined \$14 thousand and \$19 thousand impairment costs were incurred, respectively. The Company also evaluated its strategic approach to the pursuit and protection of its intellectual property. It is the intent of the Company to continue to pursue intellectual property protection. If the Company identifies certain assets where the intellectual property does not directly align with its core technology, the Company will impair the intangible asset and write-off the asset as an expense.

Note 5 – Revenue, Contract Assets and Contract Liabilities

The Company's contracts with customers generally have performance obligations and a schedule of non-refundable cancellation obligations. Performance obligations typically fall into one of three categories, product shipment, burner performance tests and engineering feasibility studies. Customer payment milestones are unique to individual contracts and may occur prior to completion of performance obligations. Customer payment terms typically range between thirty and sixty days from the date of billing. Our customer contracts typically have a duration of less than twelve months. Delays in contract performance, if any, typically occur as a result of customer onsite project delays outside of our control.

The Company recognized \$2,403 thousand of revenues and \$1,586 thousand of cost of goods sold during the year ended December 31, 2023. Revenues and cost of goods sold relate predominately to the Company's process burner product line. During 2023, the Company delivered multiple burners in connection with a single customer order. Prior to delivery, we successfully

completed multiple customer witness tests at a burner test facility for two separate customer orders. Both the witness tests and burner shipment constitute contractual performance obligations per ASC 606.

The Company recognized \$374 thousand of revenues and \$258 thousand of cost of goods sold during the year ended December 31, 2022. The revenue and cost of goods sold are mostly in connection with the completion of a technology validation project.

The Company had contract assets of \$188 thousand and \$20 thousand and contract liabilities of \$1,116 thousand and \$247 thousand at December 31, 2023 and 2022, respectively. Of the \$247 thousand contract liability balance at December 31, 2022, the Company recognized revenue \$247 thousand during the year ended December 31, 2023. In addition, the net accounts receivable balance at December 31, 2021, was \$33 thousand.

Note 6 – Product Warranties

A summary of the Company's warranty liability activity, which is included in accrued liabilities in the accompanying balance sheets as of December 31, 2023 and 2022, is as follows:

<i>(in thousands)</i>	December 31,	
	2023	2022
Warranty liability at beginning of year	\$ 5	\$ —
Accruals	105	5
Payments	—	—
Warranty liability at end of year	<u>\$ 110</u>	<u>\$ 5</u>

Note 7 - Income Taxes

For the years ended December 31, 2023 and 2022 the Company's loss before provision for income taxes were as follows:

<i>(in thousands)</i>	For the Year Ended December 31,	
	2023	2022
Domestic	\$ (5,145)	\$ (5,649)
Foreign	(50)	(109)
Loss before provision for income taxes	<u>\$ (5,194)</u>	<u>\$ (5,758)</u>

There was no provision for income taxes for the years ended December 31, 2023 and 2022.

Income tax benefit attributable to loss from continuing operations differed from the amounts computed by applying the statutory U.S federal income tax rate of 21% to pretax loss from continuing operations as a result of the following:

<i>(in thousands)</i>	For the Year Ended December 31,	
	2023	2022
Tax benefit at federal statutory rate	\$ (1,091)	\$ (1,209)
Tax benefit at state rate	(126)	(197)
Meals and entertainment	5	4
Prior year deferred tax true ups	—	(2,805)
Other	(75)	(82)
Change in valuation allowance	1,287	4,289
	<u>\$ —</u>	<u>\$ —</u>

The significant components of the Company's deferred tax assets and liabilities as of December 31, 2023 and 2022 were as follows:

<i>(in thousands)</i>	For the Year Ended December 31,	
	2023	2022
Deferred tax assets:		
Accrued expenses	\$ 86	\$ 74
Stock-based compensation	388	337
Depreciation	177	102
Prepaid expenses	61	(31)
Accrued vacation	(1)	(3)
ASC 842 lease standard	(51)	(16)
Net operating loss carryforwards	<u>21,020</u>	<u>20,263</u>
Gross deferred tax assets	21,680	20,726
Valuation allowance	<u>(21,598)</u>	<u>(20,677)</u>
Total deferred tax assets, net of valuation allowance	82	49
Deferred tax liabilities		
Other	(82)	(49)
Net deferred tax assets	<u>\$ —</u>	<u>\$ —</u>

For the year ended December 31, 2023, based on all available objective evidence, including the existence of cumulative losses, the Company determined that it was not more likely than not that the net deferred tax assets were fully realizable as of December 31, 2023. Accordingly, the Company established a full valuation allowance against its deferred tax assets.

As of December 31, 2023, the Company had \$85.3 million of federal and \$48.5 million of state net operating loss carryforwards available to reduce future taxable income, of which federal net operating loss carryforwards of \$39.1 million have an indefinite life. The federal net operating losses begin to expire in 2028, while state net operating losses begin to expire in 2025.

The Company experienced an “ownership change” within the meaning of Section 382 of the Internal Revenue Code in April 2012, subjecting net operating loss carryforwards (incurred prior to the ownership change) to an annual limitation, which may restrict the ability to use these losses to offset taxable income in periods following the ownership change. The Company determined the amount of the annual limitation to be \$686 thousand annually. The net operating loss carryforwards generated before 2018 may be used to reduce taxable income through the years 2028 to 2037. Federal net operating loss carryforwards generated for year 2018 and thereafter do not expire.

The Company files income tax returns in the U.S. federal, state and foreign jurisdictions. All tax years generally remain subject to examination by the IRS and various state taxing authorities, although the Company is not currently under examination in any jurisdiction.

The Company’s policy is to recognize interest and penalties related to income tax matters in income tax expense. As of December 31, 2023 and 2022 there was no accrued interest or penalties related to uncertain tax positions.

Note 8 – Equity

Common Stock and Preferred Stock

The Company is authorized to issue 62.5 million shares of common stock and 2.0 million shares of preferred stock. Preferences, limitations, voting powers and relative rights of any preferred stock to be issued may be determined by the Company’s Board of Directors. The Company has not issued any shares of preferred stock.

In July 2018, the Company completed a private equity offering and executed a Stock Purchase Agreement with clirSPV LLC (“clirSPV”) which permits participation in future capital raising transactions (the “Participation Right”) on the same terms as other investors participating in such transactions. In no event may the Participation Right be exercised to the extent it would cause clirSPV or any of its affiliates to beneficially own 20% or more of the Company’s then outstanding common stock. In May 2022, in connection with a waiver of the Participation Right’s notice requirements and other related closing mechanics for such Participation Right (the “Waiver”) the Company and clirSPV, LLC agreed that the Participation Right may be extended from December 31, 2023, to such date that the holders of two-thirds of the outstanding units of clirSPV LLC agree to extend each such holder’s existing agreement that he/she/it will have no right to force a redemption of his/her/its interests in clirSPV LLC (the “Redemption Right”); provided, however, that the Participation Right could not be extended to a date later than June 30, 2027. On December 30, 2023, the Company received notice from clirSPV that the holders of at least two-thirds of the outstanding units of clirSPV agreed to extend the waiver of the Redemption Right until December 31, 2024. Accordingly, the Participation Right will now expire on December 31, 2024.

The Company has an At-The-Market (“ATM”) program pursuant to a Sales Agreement with Virtu Americas LLC, as sales agent, dated December 23, 2020 (the “Sales Agreement”), pursuant to which the Company may sell shares of common stock with an aggregate offering price of up to \$8.7 million. On March 18, 2024, the Company filed a prospectus supplement suspending the ATM program. The Company will not make any sales of its common stock pursuant to the Sales Agreement unless and until a new prospectus supplement is filed with the SEC; however, the Sales Agreement remains in full force and effect. During the year ended December 31, 2023, the Company issued zero shares of its common stock from the ATM program. As of December 31, 2023, the Company has cumulatively issued approximately 1.6 million shares of common stock under the ATM program, at an average price of \$3.84 per share. Gross proceeds totaled approximately \$6.1 million and net cash proceeds was approximately \$5.9 million.

The Company is currently subject to the SEC’s “baby shelf rules,” which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company’s public float in a 12-month period. These rules may limit future issuances of shares by the Company under our Shelf Registration statement on Form S-3, the ATM Offering Sales Agreement or other securities offerings.

Equity Incentive Plan

On June 17, 2021, the Company’s shareholders approved and the Company adopted the ClearSign Technologies Corporation 2021 Equity Incentive Plan (the “2021 Plan”) which permits the Company to grant Incentive Stock Options, Non-statutory Stock Options, Stock Appreciation Rights, Restricted Stock, Restricted Stock Units, Performance Units, and Performance Shares, to eligible participants, which includes employees, directors and consultants. The Compensation Committee of the Board of Directors is authorized to administer the 2021 Plan.

The 2021 Plan provides for an annual increase in available shares equal to the lesser of (i) 10% of the aggregate number of shares of Common Stock issued by the Company in the prior fiscal year; or (ii) such number provided by the Compensation Committee; provided, however, that the total cumulative increase in the number of shares available for issuance pursuant to this automatic share increase shall not exceed 400 thousand shares of common stock. In 2023, the board of directors approved an increase of 400 thousand shares available for issuance pursuant to future awards in accordance with the terms of the 2021 Plan.

Ending balances for the 2021 Plan is as follows:

<i>(in thousands)</i>	<u>December 31,</u> 2023	<u>December 31,</u> 2022
Outstanding options and restricted stock units	3,430	3,202
Reserved but unissued shares under the Plan	2,302	2,777
Total authorized shares under the Plan	<u>5,732</u>	<u>5,979</u>

Stock Options

Under the terms of the 2021 Plan, incentive stock options and nonstatutory stock options must have an exercise price at or above the fair market value on the date of the grant. At the time of grant, the Company will determine the period within which the option may be exercised and will specify any conditions that must be satisfied before the option vests and may be exercised. The Company estimates the fair value of stock options on the date of grant using the Black-Scholes option-pricing model.

As permitted by SEC Staff Accounting Bulletin (“SAB”) 107, management utilized the simplified approach to estimate the expected term of the options, which represents the period of time that options granted are expected to be outstanding. Expected volatility has been determined through the Company’s historical stock price volatility. The Company has not made an estimate of forfeitures at the time of the grant, but rather accounts for forfeitures at the time they occur. The risk-free rate for periods within the expected life of the option is based on the U.S. Treasury yield in effect at the time of grant. The Company has never declared or paid dividends and has no plans to do so in the foreseeable future.

Inducement Options

During the year ended December 31, 2023, the Company granted non-qualified stock options to its Chief Technology Officer to purchase an aggregate of 150 thousand shares of common stock with an exercise price of \$0.91 as a material inducement to accept employment with the Company. These inducement options vest in three equal installments, with one third of the option vesting on the grant date, and each remaining third vesting on the second and third anniversaries of the grant date, subject to continued employment with the Company. The fair value of these options were estimated on the grant date using the Black Scholes valuation model, which resulted in \$112 thousand. The compensation expense recognized for these awards for the year ended December 31, 2023 was \$43 thousand.

During the year ended December 31, 2023, the Company granted non-qualified stock options to its Director of Customer Relationships and Business Development to purchase an aggregate of 150 thousand shares of common stock with an exercise price of \$1.31 as a material inducement to accept employment with the Company. These inducement options vest in three equal installments, with one third of the option vesting on the grant date, and each remaining third vesting on the second and third anniversaries of the grant date, subject to continued employment with the Company. The fair value of these options were estimated on the grant date using the Black Scholes valuation model, which resulted in \$160 thousand. The compensation expense recognized for these awards for the year ended December 31, 2023 was \$74 thousand. Two-thirds of these inducement options were forfeited in 2023 upon the departure of the Director of Customer Relationships and Business Development.

These inducement options were granted outside of the 2021 Plan and in accordance with the employment inducement exemption provided under Nasdaq Listing Rule 5635(c)(4).

Equity Incentive Plan Options

Compensation expense associated with stock option awards for the years ended December 31, 2023 and 2022 totaled \$174 thousand and \$118 thousand, respectively.

A summary of the Company’s Equity Incentive Plan stock option activity and changes is as follows:

	December 31,		
	2023		
<i>(in thousands, except per share data)</i>	Options to Purchase Common Stock	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)
Outstanding at beginning of year	2,779	\$ 2.05	6.43
Granted	—	\$ —	—
Exercised	(20)	\$ 0.54	—
Forfeited/Expired	—	\$ —	—
Outstanding at end of period	<u>2,759</u>	\$ 2.07	5.38
Exercisable at end of period	<u>2,024</u>	\$ 1.71	4.87

The estimated aggregate pretax intrinsic value of the Company's outstanding vested stock options at December 31, 2023 is \$171 thousand. The intrinsic value is the difference between the Company's common stock price and the option exercise prices multiplied by the number of in-the-money options. This amount changes based on the fair value of the Company's common stock.

At December 31, 2023, there was \$1.0 million of total unrecognized compensation cost related to non-vested stock option-based compensation arrangements. Vesting criteria ranges from time-based to performance-based. The Company records costs for time-based arrangements ratably across the timeframe, whereas performance-based arrangements require management to continually evaluate predetermined goals against actual circumstances.

Restricted Stock Units

The Company awards employees and directors restricted stock units ("RSUs") in lieu of cash payment for compensation. These awards are granted from the Company's Equity Incentive Plan. Employee vesting criteria is time based, and compensation expense is recognized ratably across the timeframe.

Director vesting criteria is contingent upon the occurrence of one of four future events, which the Company cannot predict or control. Therefore, compensation expense for director RSUs is not recognized until one of these four future events occur, which is in accordance with FASB Accounting Standards Codification, Topic 718, *Compensation-Stock Compensation*, (ASC 718). Unrecognized compensation expense for director services amounted to \$244 thousand and \$491 thousand for the years ended December 31, 2023 and 2022, respectively. Director compensation is earned on a quarterly basis with the target value of compensation set at \$85 thousand per quarter.

A summary of the Company's RSUs activity and changes is as follows:

	December 31,		December 31,	
	2023		2022	
<i>(in thousands, except per share data)</i>	Number of Shares	Weighted Average Grant Date Fair Value	Number of Shares	Weighted Average Grant Date Fair Value
Nonvested at beginning of year	423	\$ 1.49	112	\$ 2.28
Granted	617	\$ 0.82	376	\$ 1.30
Vested	(361)	\$ 1.18	(65)	\$ 1.77
Forfeited	(8)	\$ 0.79	—	\$ —
Nonvested at end of period	<u>671</u>	<u>\$ 1.05</u>	<u>423</u>	<u>\$ 1.49</u>

A summary of the Company's RSU compensation expense is as follows:

	For the Year Ended	
	December 31,	
<i>(in thousands, except per share data)</i>	2023	2022
Compensation Expense	\$ 337	\$ 252
Weighted Average Value Per Share	\$ 0.83	\$ 1.57

Stock Awards

The Company awards employees stock in lieu of cash payment for compensation, typically to satisfy accrued bonus compensation. The awards are granted from the Company's 2021 Plan.

	For the Year Ended	
	December 31,	
<i>(in thousands, except per share data)</i>	2023	2022
Fair value	\$ 234	\$ 98
Weighted Average Value Per Share	\$ 0.79	\$ 1.43

Consultant Stock Plan

The 2013 Consultant Stock Plan (the “Consultant Plan”) provides for the granting of shares of common stock to consultants who provide services related to capital raising, investor relations, and making a market in or promoting the Company’s securities. The Company’s officers, employees, and board members are not entitled to receive grants from the Consultant Plan. The Compensation Committee of the Board of Directors is authorized to administer the Consultant Plan and establish the grant terms. The Consultant Plan provides for quarterly increases in the available number of authorized shares equal to the lesser of 1% of any new shares issued by the Company during the quarter immediately prior to the adjustment date or such lesser amount as the Board of Directors shall determine.

The Consultant Plan activity and change is as follows:

<i>(in thousands)</i>	December 31,	
	2023	2022
Reserved but unissued shares at beginning of year	196	211
Increases in the number of authorized shares	7	—
Grants	(15)	(15)
Reserved but unissued shares at end of year	188	196

The Consultant Plan compensation expense is summarized as follows:

<i>(in thousands, except per share data)</i>	For the Year Ended December 31,	
	2023	2022
Compensation Expense	\$ 10	\$ 26
Weighted Average Value Per Share	\$ 0.69	\$ 1.61

Note 9 – Retirement Plan

The Company has a defined contribution retirement plan covering all of its U.S. employees whereby the Company matches employee contributions up to 3% of their base salary. The Company’s matching contribution expense totaled \$64 thousand and \$54 thousand during the years ended December 31, 2023 and 2022, respectively.

Note 10 – Commitments and Contingencies

Litigation

From time to time the Company may become involved in various lawsuits and legal proceedings which arise in the ordinary course of business. Litigation is subject to inherent uncertainties and an adverse result in any such matter may harm the Company’s business. As of the date of this report, the Company is not a party to any material pending legal proceedings or claims that the Company believes will have a material adverse effect on the business, financial condition or operating results.

Indemnification Agreements

The Company maintains indemnification agreements with our directors and officers that may require the Company to indemnify these individuals against liabilities that arise by reason of their status or service as directors or officers, except as prohibited by law.

Note 11 – Government Assistance

During 2022, the Company was awarded a research grant from the Department of Energy (“DOE”) for approximately \$250 thousand with the completion occurring in March 2023. The purpose of the grant was to produce a research paper for a flexible fuel ultra-low NOx process burner capable of burning 100% hydrogen fuel. During 2023, the Company was awarded a Phase 2 grant from the DOE to continue developing this ultra-low NOx hydrogen burner. The Phase 2 grant amount totaled approximately \$1.6 million over a two-year period. These awards allow the Company to request reimbursements for expenditures such as labor, material, and administrative costs. During the years ended December 31, 2023 and 2022, the Company recognized \$191 thousand and \$181 thousand in reimbursements from the DOE, respectively.

Beginning in 2021, the Company received funds relating to the Oklahoma 21st Century Quality Jobs Act. The estimated duration of the program is up to 10 years and is designed to attract growth industries to Oklahoma. By reporting quarterly salary statistics and meeting agreed upon employment thresholds, the state remits benefit monies to the Company. During the years ended December 31, 2023 and 2022, the Company recognized \$64 thousand and \$51 thousand in government assistance from this program, respectively.

Note 12 – Quarterly Results (unaudited)

Quarterly results for the years ended December 31, 2023 and 2022 are as follows:

(in thousands, except per share data)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
For the year ended December 31, 2023				
Revenue	\$ 894	\$ 150	\$ 85	\$ 1,274
Gross Profit (Loss)	\$ 106	\$ 129	\$ 24	\$ 558
Operating Expense	\$ 1,810	\$ 1,758	\$ 1,521	\$ 1,709
Net loss	\$ (1,429)	\$ (1,478)	\$ (1,332)	\$ (955)
Net Loss per share - basic and fully diluted	\$ (0.04)	\$ (0.04)	\$ (0.03)	\$ (0.03)
For the year ended December 31, 2022				
Revenue	\$ —	\$ —	\$ 324	\$ 50
Gross Profit (Loss)	\$ —	\$ —	\$ 123	\$ (7)
Operating Expense	\$ 1,517	\$ 1,660	\$ 1,558	\$ 1,498
Net loss	\$ (1,490)	\$ (1,638)	\$ (1,312)	\$ (1,318)
Net Loss per share - basic and fully diluted	\$ (0.05)	\$ (0.05)	\$ (0.03)	\$ (0.03)

Note 13 – Subsequent Events

On February 22, 2024, the Company’s board of directors and compensation committee approved and paid the 2023 bonus accrual allocated to the Company’s Chief Executive Officer, Colin James Deller, and Chief Financial Officer, Brent Hinds, in the form of common stock and restricted stock units (“RSUs”). After applicable tax withholdings, Dr. Deller received 66,019 shares of common stock valued at \$1.06 per share. After applicable tax withholdings, Mr. Hinds received 28,555 shares of common stock valued at \$1.06 per share. In addition, Mr. Hinds received RSUs for 7,547 shares of common stock that will vest in three equal installments commencing on the first anniversary of the grant date, and performance-based restricted stock units (“PRSUs”) for 2,627 shares of common stock that will vest upon the achievement of certain established performance targets. The PRSUs will not vest and be forfeited if such performance targets are not achieved during the measuring period ending December 31, 2024.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

CLEARSIGN TECHNOLOGIES CORPORATION

Date: April 1, 2024

By: /s/ Colin J. Deller
Colin J. Deller
Chief Executive Officer

Date: April 1, 2024

By: /s/ Brent Hinds
Brent Hinds
Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Colin James Deller and Brent Hinds as their true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agents full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agents, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Date: April 1, 2024

/s/ Colin J. Deller
Colin J. Deller
Chief Executive Officer and Director
(Principal Executive Officer)

Date: April 1, 2024

/s/ Brent Hinds
Brent Hinds
Chief Financial Officer
(Principal Financial and Accounting Officer)

Date: April 1, 2024

/s/ Robert T. Hoffman Sr.
Robert T. Hoffman Sr., Director

Date: April 1, 2024

/s/ Judith S. Schrecker
Judith S. Schrecker, Director

Date: April 1, 2024

/s/ Catharine Marie de Lacy
Catharine Marie de Lacy, Director