



# Photorefractor Vision Screening System

*For early detection of eye abnormalities and eye diseases in children*



*A child being screened with the VisiScreen OSS-C.*

Optics technology originally developed by NASA's Marshall Space Flight Center for space telescopes in the 1970s has found new life as a highly successful screening device for the detection of vision problems in children. Vision Research Corporation's VisiScreen™ Ocular Screening System (OSS-C) has helped detect eye abnormalities and eye diseases in millions of infants and children since its commercialization in 1991. This photorefractive technology provides fast, simple, non-invasive, early screening for conditions such as nearsightedness, farsightedness, astigmatism, cataracts, and amblyopia (or "lazy eye," the leading cause of preventable blindness in children).

## Benefits of Technology Transfer

- **Benefits young children:** The VisiScreen OSS-C is the first vision screening system that requires no response from the child being screened so it can be used on infants, pre-verbal, or non-verbal children.
- **Promotes early intervention:** An estimated one in ten school-age children has a vision problem, some of which may lead to blindness. With early detection, almost all of these problems can be corrected.
- **Helps children succeed in school:** School-age children with undiagnosed vision problems require more teacher attention, are often wrongly diagnosed as learning disabled, and run a higher risk of falling behind academically.
- **Reaches millions of U.S. families:** Vision Research Corporation's (VRC's) large-scale screenings reach hundreds of thousands of infants and children each year through schools, day care centers, pediatricians, and family doctors.

*VisiScreen is a trademark of Vision Research Corporation.*

SUCCESS

## On the Record

“It has been a great collaboration with NASA. This technology required expertise in so many areas—optics, electronics, biotechnology, health—and the depth of expertise available at NASA has been wonderful. They have been extremely supportive in helping us convert this from a lab-based technology usable by rocket scientists into a real-world technology for the detection of eye problems in children.” — *James Kennemer, President, Vision Research Corporation*

## About Vision Research Corporation

Vision Research Corporation (VRC), based in Birmingham, Alabama, specializes in the development and implementation of advanced-technology screening systems and programs for the detection of eye problems in children. VRC is the only provider of comprehensive, large-scale photorefractive eye screening programs in the country. They have screened over 4 million children for eye problems in public schools and day care centers, thereby minimizing academic problems resulting from poor vision, identifying children who need to be seen by an eye care professional, and helping children receive necessary examinations and treatment.

## Technology Origins

The photorefractive optics technology was originally developed for use in NASA space telescopes and Earth imaging systems during the Landsat and Skylab space telescope missions in the 1970s. While working at Marshall Space Flight Center on image processing and space optics, Joseph Kerr and the late John Richardson discovered that eye abnormalities and diseases cause the eyes to reflect light in distinctly different ways. This discovery led the innovators to develop and patent a method and device for detecting human eye defects.

## Finding a New Use

Kerr was working as a consultant for Science Applications International Corporation, in Huntsville, Alabama, when he met an ophthalmologist studying ways to improve vision screening for children. Kerr instantly saw that his work at NASA was applicable to vision screening and he received funding from NASA's Research and Technology Operating Plan (RTOP) to pursue technology transfer of NASA's optics technology. In collaboration with research ophthalmologists and optometrists, the NASA team developed a vision screening method based on a process called photorefractive.

A photorefractor consisting of a special camera, lens, and electronic flash takes a detailed, highly precise color photo of the child's eyes that can then be analyzed for abnormalities. Initial tests proved highly successful and were followed by a series of refinements and formal clinical studies.



Screening image showing normal indications in a child's right eye, and indications of significant farsightedness in the left eye.

## The Transfer Process

With the help of a cost-sharing contract from NASA, Kerr formed Electro-Optic Instruments Inc., in Wedowee, Alabama (later named Medical Sciences Corporation). In 1989, VRC president James Kennemer learned of the ocular screening technology through a contact in Marshall Space Flight Center's Technology Commercialization and Licensing office. VRC acquired Kerr's company and began marketing the VisiScreen system in 1991 under an exclusive license from NASA. Since that time, VRC has performed vision screenings on over 4 million children in the United States.

## Looking Ahead

VRC is planning more improvements and enhancements to the VisiScreen technology, and they are currently testing the next generation of the screening system. The new, digital version still relies on the same photorefractive technology originally developed by NASA, and it offers several advanced features that will allow the screening system to be even more effective at detecting eye problems in young children.

## For More Information

If you would like more information about this technology (MFS-26011-1) or about other technologies available for license, please contact:

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