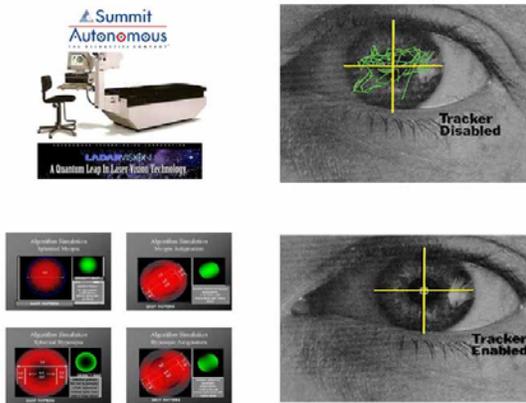


## **Center for Refractive Surgery Walter Reed Health Care System**

The primary mission of the Center for Refractive Surgery, Walter Reed Army Medical Center, is to evaluate the effectiveness and safety of laser refractive surgery for military operations. State-of-the-art technology includes the Autonomous Technologies LADARVision small spot (<1mm) excimer laser, active eye tracking (4,000 times/sec), optical wavefront sensing, ORBSCAN corneal analysis, infrared pupillometry, and operationally-based measures of visual performance under simulated day and night conditions.

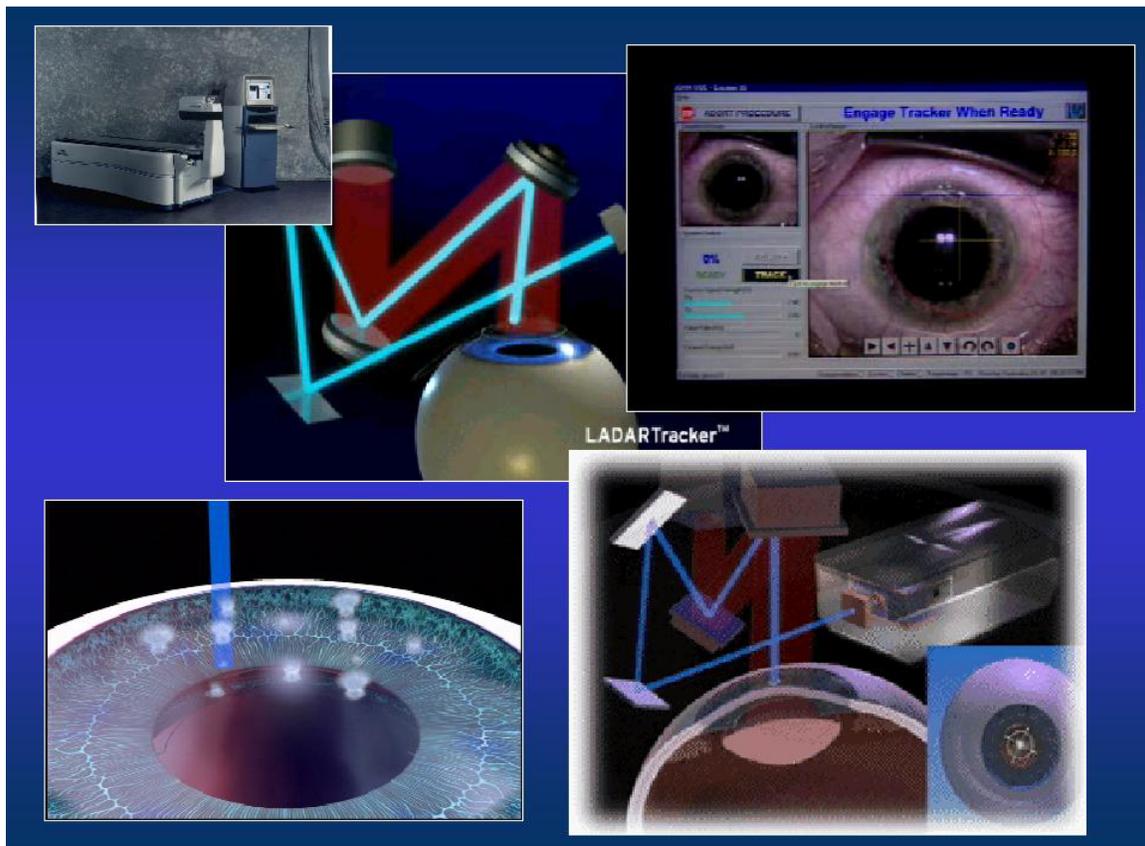
## Autonomous LADARVision Excimer Laser



The Autonomous LADARVision excimer laser is the only technology in the world to use a laser guided tracking system. This tracking technology was originally developed and used by NASA. During surgery the built-in eye tracker monitors eye movements at 4000 times per second. It simultaneously adjusts the laser to insure the accurate placement of each laser pulse.

LADARVision uses a small beam of less than 1 mm, which the computer rapidly moves over the cornea in a pattern of overlapping spots. This "flying spot" treatment allows smooth corneal shaping with good post-operative visual outcomes by eliminating eye position and movement as a treatment variable.

The LADARVision excimer laser has the capability to link with state-of-the-art wavefront sensing technology to produce "CUSTOM CORNEA" ablations with the potential for improved and theoretically even super-normal visual results. This technology currently is being studied for FDA approval in this country.





## **EPIC-2100 Integrated Refractive Station**

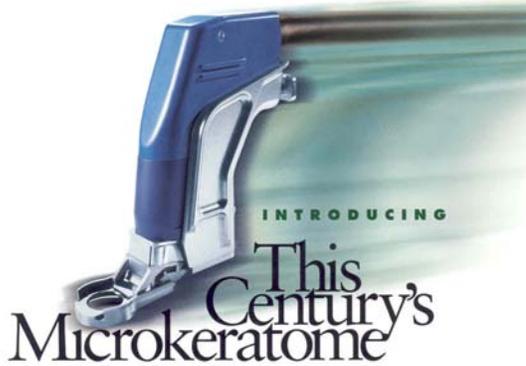


The patient's refractive error, including near sightedness, far-sightedness & astigmatism, is measured based on patient responses, as well as with objective techniques.

The Epic-2100 allows technical personnel to perform accurate and precise visual measurements using an integrated unit on one base. The RT-2100 interfaces with the NIDEK Auto Refractometer/Keratometer and the Nidek Lensmeter making it easy to transfer and store patient data in its memory for further objective refining. Data can be printed and stored. Monocular and binocular visual acuity with and without correction and pinhole testing can be achieved with the touch of a button. Binocular vision function can also be evaluated.

The instrument objectively measures the refractive power by using the built-in charts and corrective lenses. It has a main body and a measuring unit. A TV monitor, a control panel, and a joystick are used to make alignments or manipulations. The patient looks into the measuring window where the infrared ray radiates on the patient's eye. There is an auto-tracking mechanism, which moves the measuring unit to follow eye movement, and an auto-shot function, which makes serial measurements start automatically when the instrument becomes correctly focused.

## AMADEUS Microkeratome

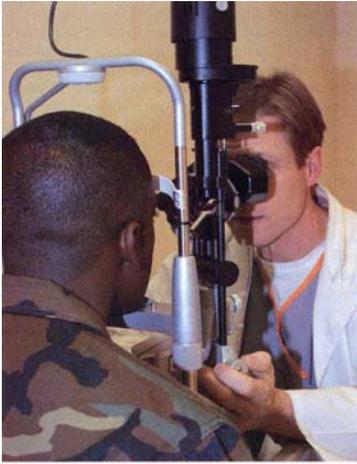


The Amadeus Microkeratome is extremely accurate and predictable. This is very important when treating corneas with low pachymetry readings (thin corneas) where the surgeon must be sure of the flap thickness to avoid leaving too little stromal thickness in the stromal bed after ablation and risking progressive corneal ectasia post-operatively. It provides a high degree of precision, programmability and ease of use for both the experienced and beginner refractive surgeon. There is no on-eye assembly

and unique programmability of the hinge setting greatly reduces the chance of flap complications, which translates to a safer procedure.

AMADEUS™

## Exam Rooms



All refractive surgery patients need a complete eye examination by a provider experienced in refractive surgery. This evaluation includes a careful refraction to fine-tune the spectacle prescription, intraocular pressure testing and a thorough dilated fundus exam to rule out visually significant cataracts or any retinal abnormality. Measurements of corneal curvature, shape and thickness and the pupil size are also needed for a successful visual outcome. Comprehensive eye evaluations, using advanced measures of vision performance under day and nighttime conditions, are conducted in state-of-the-art examination lanes before and after all procedures.



## Colvard Pupillometer



The Colvard Pupillometer is quickly becoming the standard of care for measuring a patient's pre-surgical pupil size. The LADARVision allows surgeons to adjust the laser treatment zone to accommodate patients with large pupils. Therefore, accurately measuring a patient's pupil size in dim lighting significantly reduces the risk of night glare and halos.

## Wavefront Analysis



In addition to basic measures of near-sightedness, far-sightedness and astigmatism, it is now possible to measure higher order optical imperfections (aberrations) of the eye, which limit vision, particularly at night. By correcting these aberrations with laser surgery, it may be possible to achieve *super-normal levels of vision*-an exciting prospect for patients today and tomorrow.

The WaveFront Sciences Complete Ophthalmic Analysis System™ (COAS™) provides comprehensive analysis of the refractive error of the eye. Surgeons acquire information needed to achieve superior results for their patients. The system provides rapid, accurate refractive analysis, including higher order aberrations, pupil assessment, and the ability to track patient ophthalmic performance

in a quantitative manner. Real time measurements provide the ability to analyze aberrations in many different forms including displays Zernicke polynomials and high-resolution wavefront maps. Doctors can make comparisons and animations of patient wavefront measurements pre- and post- surgery, to monitor the healing process and to average measurements over time.

## **NVG/CRT Display**

Our research focus is to determine the effectiveness and safety of laser refractive surgery for combat operations, including night vision and night vision devices, night firing, Army aviation, helmet-mounted displays, and land navigation.

Combat operations often occur at night or under conditions of limited visibility. To assess the effectiveness of refractive surgery for military operations, basic and applied performance testing is conducted under nighttime conditions.