



Food and Drug Administration  
9200 Corporate Boulevard  
Rockville MD 20850

Ms. Shirley K. McGarvey  
Regulatory Consultant  
Autonomous Technologies Corporation  
2800 Discovery Drive  
Orlando, Florida 32826

NOV - 2 1998

Re: P970043  
LADARVision® Excimer Laser System  
Filed: September 5, 1997  
Amended: October 20, November 24, 25, and 26, and December 15, 1997, February 3,  
March 10, April 10, April 17, July 2, July 22 (2 amendments), August 10,  
August 20, September 17, 25, 28, and 29, and October 13, 1998

Dear Ms. McGarvey:

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your premarket approval application (PMA) for the LADARVision® Excimer Laser System. This device is indicated for use in photorefractive keratectomy (PRK) treatment for the reduction or elimination of mild to moderate myopia in patients with the following three characteristics:

1. between -1.00 D to -10.00 D of sphere and less than or equal to -4.00 D of astigmatism at the spectacle plane, the combination of which must result in an attempted correction between -0.50 D and -10.00 D spherical equivalent (SE) at the spectacle plane where sphere or cylinder is at least 1.00 D;
2. who are 21 years of age or older; and,
3. with documented stability of refraction for the prior 12 months, as demonstrated by a change of less than or equal to 0.50 D for corrections up to -7.00 D SE, and less than or equal to -1.00 D for corrections greater than -7.00 D SE.

We are pleased to inform you that the PMA is approved subject to the conditions described below and in the "Conditions of Approval" (enclosed). You may begin commercial use and treatment with this device of patients who fulfill the above stated indications after you submit an amendment to this PMA submission with copies of all approved labeling in final printed form.

The sale, distribution, and use of this device are restricted to prescription use in accordance with 21 CFR 801.109 within the meaning of section 520(e) of the Federal Food, Drug, and Cosmetic Act (the act) under the authority of section 515(d)(1)(B)(ii) of the act. FDA has also determined that, to ensure the

safe and effective use of the device, the device is further restricted within the meaning of section 520(e) under the authority of section 515(d)(1)(B)(ii), (1) insofar as the labeling must specify the requirements that apply to the training of practitioners who may use the device as approved in this order and (2) insofar as the sale, distribution, and use must not violate sections 502(q) and (r) of the act.

These restrictions on the device are applicable to Autonomous Technologies Corporation (ATC), as well as any users or purchasers of this device. ATC must notify any purchasers or users of these restrictions and include them in your training programs.

1. The LADARVision® Excimer Laser System has only been approved to perform PRK to treat myopia ranging from -1.00 D to -10.00 D, with or without astigmatism ranging from 0.00 D to 4.00 D. The device has not been approved to perform laser in situ keratomileusis (LASIK) and it has not been approved to correct high myopia (nearsightedness >-10.00 D), high astigmatism (>4.00 D), or farsightedness. Labeling, promotion, and advertising are restricted to the PRK modality because no data on the safety and effectiveness of this device for these unapproved indications were submitted to FDA for review and evaluation.
2. Only licensed practitioners who are experienced in the medical management and surgical treatment of the cornea, and who have been trained in laser system calibration and operation to perform laser refractive surgery (for myopia and astigmatism), may use the device as approved in this order.
3. Prospective patients, as soon as they express an interest in myopic or astigmatic PRK and prior to undergoing surgery, must receive the Patient Information Booklet (as described in your final submission to this PMA) from the treatment provider.
4. Prior to undergoing surgery, prospective patients must be informed of the alternatives for correcting their myopia and/or astigmatism including eyeglasses, contact lenses and other refractive surgeries such as radial keratotomy.
5. Comparison of the safety and effectiveness of this laser with any other method of refractive correction is prohibited. This prohibition is based on the fact that the data submitted for PMA approval of the LADARVision® Excimer Laser System do not compare the clinical outcome of this device with any other method of refractive correction. Such comparisons of safety and effectiveness are misleading and would misbrand your laser in accordance with section 502(a) of the act.

6. All promotion and advertising for this device must include the following information on indications, risks, and benefits:

The LADARVision® Excimer Laser System is approved to perform photorefractive keratectomy (PRK) for the correction of mild to moderate myopia between -1.00 D to -10.00 D with up to -4.00 D of astigmatism. Alternatives to PRK include: eyeglasses, contact lenses, LASIK, radial keratotomy or automated lamellar keratoplasty. In studies of 604 eyes (417 myopic eyes; 187 eyes with myopic astigmatism) after final treatment with refractive data at 6 months, 95.9% and 93.2%, respectively, were corrected to 20/40 or better and 69.7% and 59.3%, respectively, were corrected to 20/20 or better without spectacles or contact lenses. The following adverse events and complications were reported during the course of the clinical trial: feeling of something in the eye (3.0% - spherical myopia; 2.4% - myopic astigmatism); double/ghost images (2.6% - spherical myopia; 6.2% myopic astigmatism); peripheral epithelial defect (1.3% - spherical myopia; 0.5% - myopic astigmatism); pain (1.3% - spherical myopia; 1.9% - myopic astigmatism); halos/starbursts (0.6% - spherical myopia; 0.5% - myopic astigmatism); corneal infiltrates (1.6% combined cohort); increased intraocular pressure above 25mmHg (0.6% combined cohort); corneal ulcer (0.1% combined cohort); and retinal vascular accident (0.1% combined cohort). The loss of > 2 lines best spectacle corrected visual acuity (BSCVA) at 6 months was 0.5% for spherical myopia and 0.0% for myopic astigmatism, and pretreatment BSCVA 20/20 or better with post-treatment BSCVA worse than 20/25 was 0.5% for spherical myopia and 0.0% for myopia astigmatism.

Other findings that occurred at a rate of <0.3% (spherical myopia) included corneal erosion; corneal abrasion (<0.5% for astigmats); scratchiness; pain; epithelial irregularity; corneal swelling; subconjunctival hemorrhage; light sensitivity; epithelial dots; iritis (<0.5% for astigmats), and ocular hypertension.

The following complications were reported by subjects: difficulty with night driving (4.3% - spherical myopia; 9.4% - myopic astigmatism); glare (1.7% - spherical myopia; 4.4% - myopic astigmatism); halos (2.3% - spherical myopia; 6.1% - myopic astigmatism); feeling of something in the eye (1.4% - spherical myopia; 0.0% - myopic astigmatism); fluctuation of vision (1.1% - spherical myopia; 3.8% - myopic astigmatism); blurring of vision (0.9% - spherical myopia; 2.2% - myopic astigmatism); light sensitivity (0.9% - spherical myopia; 0.5% - myopic astigmatism); headache (0.3% - spherical myopia; 0.5% - myopic astigmatism); double vision (0.3% - spherical myopia; 0.5% - myopic astigmatism); pain (0.3% - spherical myopia; 0.0% - myopic astigmatism); extensive tearing (0.3% - spherical myopia; 0.0% - myopic astigmatism); burning (0.3% - spherical myopia; 0.0% - myopic astigmatism).

All required documents should be submitted in triplicate, unless otherwise specified, to the address below and should reference the above PMA number to facilitate processing.

PMA Document Mail Center (HFZ-401)  
Center for Devices and Radiological Health  
Food and Drug Administration  
9200 Corporate Blvd.  
Rockville, Maryland 20850

In addition to the postapproval requirements in the enclosure, the following information must also be submitted to the Agency:

1. in your annual report, for two years following approval, you must report on unscheduled maintenance visits (i.e., those beyond the usual laser maintenance schedule) to monitor laser performance and reliability; and,
2. you must immediately submit reports to FDA CDRH's Office of Compliance at the address below of any instances of device tampering.

OC/Division of Enforcement (HFZ-331)  
Center for Devices and Radiological Health  
Food and Drug Administration  
2098 Gaither Road  
Rockville, Maryland 20850

CDRH will notify the public of its decision to approve your PMA by making available a summary of the safety and effectiveness data upon which the approval is based. The information can be found on the FDA CDRH Internet HomePage located at <http://www.fda.gov/cdrh/pmapage.html>. Written requests for this information can also be made to the Dockets Management Branch, (HFA-305), Food and Drug Administration, 12420 Parklawn Drive, Room 1-23, Rockville, MD 20857. The written request should include the PMA number or docket number. Within 30 days from the date that this information is placed on the Internet, any interested person may seek review of this decision by requesting an opportunity for administrative review, either through a hearing or review by an independent advisory committee, under section 515(g) of the Federal Food, Drug, and Cosmetic Act (the act).

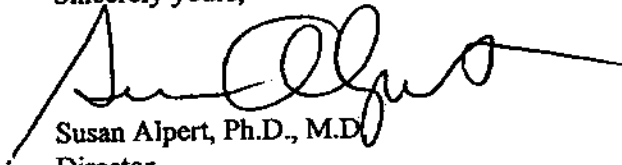
Failure to comply with the conditions of approval invalidates this approval order. Commercial distribution of a device that is not in compliance with these conditions is a violation of the Act.

You are reminded that, as soon as possible and before commercial distribution of your device, you must submit an amendment to this PMA submission with copies of all approved labeling in final printed form.

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If you have any questions concerning this approval order, please contact Daryl L. Kaufman at (301) 594-2018.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Susan Alpert", with a long horizontal line extending to the right.

Susan Alpert, Ph.D., M.D.  
Director  
Office of Device Evaluation  
Center for Devices and  
Radiological Health

Enclosure: "Conditions of Approval"

Issued: 3-4-98

#### CONDITIONS OF APPROVAL

APPROVED LABELING. As soon as possible, and before commercial distribution of your device, submit three copies of an amendment to this PMA submission with copies of all approved labeling in final printed form to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration (FDA), 9200 Corporate Blvd., Rockville, Maryland 20850.

ADVERTISEMENT. No advertisement or other descriptive printed material issued by the applicant or private label distributor with respect to this device shall recommend or imply that the device may be used for any use that is not included in the FDA approved labeling for the device. If the FDA approval order has restricted the sale, distribution and use of the device to prescription use in accordance with 21 CFR 801.109 and specified that this restriction is being imposed in accordance with the provisions of section 520(e) of the act under the authority of section 515(d)(1)(B)(ii) of the act, all advertisements and other descriptive printed material issued by the applicant or distributor with respect to the device shall include a brief statement of the intended uses of the device and relevant warnings, precautions, side effects and contraindications.

PREMARKET APPROVAL APPLICATION (PMA) SUPPLEMENT. Before making any change affecting the safety or effectiveness of the device, submit a PMA supplement for review and approval by FDA unless the change is of a type for which a "Special PMA Supplement-Changes Being Effectuated" is permitted under 21 CFR 814.39(d) or an alternate submission is permitted in accordance with 21 CFR 814.39(e). A PMA supplement or alternate submission shall comply with applicable requirements under 21 CFR 814.39 of the final rule for Premarket Approval of Medical Devices.

All situations which require a PMA supplement cannot be briefly summarized, please consult the PMA regulation for further guidance. The guidance provided below is only for several key instances.

A PMA supplement must be submitted when unanticipated adverse effects, increases in the incidence of anticipated adverse effects, or device failures necessitate a labeling, manufacturing, or device modification.

A PMA supplement must be submitted if the device is to be modified and the modified device should be subjected to animal or laboratory or clinical testing designed to determine if the modified device remains safe and effective.

A "Special PMA Supplement - Changes Being Effectuated" is limited to the labeling, quality control and manufacturing process changes specified under 21 CFR 814.39(d)(2). It allows for the addition of, but not the replacement of previously approved, quality control specifications and test methods. These changes may be implemented before FDA approval upon acknowledgment by FDA that the submission is being processed as a "Special PMA Supplement - Changes Being Effectuated." This acknowledgment is in addition to that issued by the PMA Document Mail Center for all PMA supplements submitted. This procedure is not applicable to changes in device design, composition, specifications, circuitry, software or energy source.

Alternate submissions permitted under 21 CFR 814.39(e) apply to changes that otherwise require approval of a PMA supplement before implementation of the change and include the use of a 30-day PMA supplement or annual postapproval report. FDA must have previously indicated in an advisory opinion to the affected industry or in correspondence with the applicant that the alternate submission is permitted for the change. Before such can occur, FDA and the PMA applicant(s) involved must agree upon any needed testing protocol, test results, reporting format, information to be reported, and the alternate submission to be used.

POSTAPPROVAL REPORTS. Continued approval of this PMA is contingent upon the submission of postapproval reports required under 21 CFR 814.84 at intervals of 1 year from the date of approval of the original PMA. Postapproval reports for supplements approved under the original PMA, if applicable, are to be included in the next and subsequent annual reports for the original PMA unless specified otherwise in the approval order for the PMA supplement. Two copies identified as "Annual Report" and bearing the applicable PMA reference number are to be submitted to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850. The postapproval report shall indicate the beginning and ending date of the period covered by the report and shall include the following information required by 21 CFR 814.84:

(1) Identification of changes described in 21 CFR 814.39(a) and changes required to be reported to FDA under 21 CFR 814.39(b).

(2) Bibliography and summary of the following information not previously submitted as part of the PMA and that is known to or reasonably should be known to the applicant:

(a) unpublished reports of data from any clinical investigations or nonclinical laboratory studies involving the device or related devices ("related" devices include devices which are the same or substantially similar to the applicant's device); and

(b) reports in the scientific literature concerning the device.

If, after reviewing the bibliography and summary, FDA concludes that agency review of one or more of the above reports is required, the applicant shall submit two copies of each identified report when so notified by FDA.

ADVERSE REACTION AND DEVICE DEFECT REPORTING. As provided by 21 CFR 814.82(a)(9), FDA has determined that in order to provide continued reasonable assurance of the safety and effectiveness of the device, the applicant shall submit 3 copies of a written report identified, as applicable, as an "Adverse Reaction Report" or "Device Defect Report" to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850 within 10 days after the applicant receives or has knowledge of information concerning:

(1) A mix-up of the device or its labeling with another article.

(2) Any adverse reaction, side effect, injury, toxicity, or sensitivity reaction that is attributable to the device and  
(a) has not been addressed by the device's labeling or

(b) has been addressed by the device's labeling, but is occurring with unexpected severity or frequency.

(3) Any significant chemical, physical or other change or deterioration in the device or any failure of the device to meet the specifications established in the approved PMA that could not cause or contribute to death or serious injury but are not correctable by adjustments or other maintenance procedures described in the approved labeling. The report shall include a discussion of the applicant's assessment of the change, deterioration or failure and any proposed or implemented corrective action by the applicant. When such events are correctable by adjustments or other maintenance procedures described in the approved labeling, all such events known to the applicant shall be included in the Annual Report described under "Postapproval Reports" above unless specified otherwise in the conditions of approval to this PMA. This postapproval report shall appropriately categorize these events and include the number of reported and otherwise known instances of each category during the reporting period. Additional information regarding the events discussed above shall be submitted by the applicant when determined by FDA to be necessary to provide continued reasonable assurance of the safety and effectiveness of the device for its intended use.

REPORTING UNDER THE MEDICAL DEVICE REPORTING (MDR) REGULATION. The Medical Device Reporting (MDR) Regulation became effective on December 13, 1984. This regulation was replaced by the reporting requirements of the Safe Medical Devices Act of 1990 which became effective July 31, 1996 and requires that all manufacturers and importers of medical devices, including in vitro diagnostic devices, report to the FDA whenever they receive or otherwise become aware of information, from any source, that reasonably suggests that a device marketed by the manufacturer or importer:

- (1) May have caused or contributed to a death or serious injury; or
- (2) Has malfunctioned and such device or similar device marketed by the manufacturer or importer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur.

The same events subject to reporting under the MDR Regulation may also be subject to the above "Adverse Reaction and Device Defect Reporting" requirements in the "Conditions of Approval" for this PMA. FDA has determined that such duplicative reporting is unnecessary. Whenever an event involving a device is subject to reporting under both the MDR Regulation and the "Conditions of Approval" for a PMA, the manufacturer shall submit the appropriate reports required by the MDR Regulation within the time frames as identified in 21 CFR 803.10(c) using FDA Form 3500A, i.e., 30 days after becoming aware of a reportable death, serious injury, or malfunction as described in 21 CFR 803.50 and 21 CFR 803.52 and 5 days after becoming aware that a reportable MDR event requires remedial action to prevent an unreasonable risk of substantial harm to the public health. The manufacturer is responsible for submitting a baseline report on FDA Form 3417 for a device when the device model is first reported under 21 CFR 803.50. This baseline report is to include the PMA reference number. Any written report and its envelope is to be specifically identified, e.g., "Manufacturer Report," "5-Day Report," "Baseline Report," etc.



Any written report is to be submitted to:

Food and Drug Administration  
Center for Devices and Radiological Health  
Medical Device Reporting  
PO Box 3002  
Rockville, Maryland 20847-3002

Copies of the MDR Regulation (FOD # 336&1336) and FDA publications entitled "An Overview of the Medical Device Reporting Regulation" (FOD # 509) and "Medical Device Reporting for Manufacturers" (FOD #987) are available on the CDRH WWW Home Page. They are also available through CDRH's Fact-On-Demand (F-O-D) at 800-899-0381. Written requests for information can be made by sending a facsimile to CDRH's Division of Small Manufacturers Assistance (DSMA) at 301-443-8818.