

# NARTE NEWS

Volume 23 Spring 2006 Number 2



**NARTE Headquarters**



**COVER** This photo of NARTE Headquarters at 167 Village Street in Medway, Massachusetts, was contributed to NARTE News by the headquarters gang.

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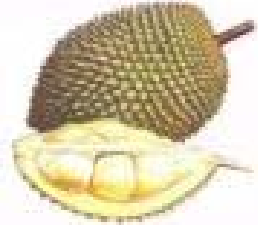
# Headquarters Highlights

by *Russell V. Carstensen, Executive Director*

**SPRING 2006**

## Highlights from Singapore

### Durian Confirmed



Durian is a fruit which is well liked in Southeast Asian countries, but westerners usually do not want to try it because it has a pungent smell that is difficult to describe. Some people compare the penetrating odor of durian to cheeses like Limburger. Airlines and hotels in Southeast Asia do not allow clientele to enter them with durian in their possession. The flesh is like a thick, rich, mildly sweet custard or soft cheese like Brie. It is often eaten with sticky rice and coconut cream or used to flavor ice cream.

One authority on the Internet has stated, "It has the texture of a cold cow pat, it smells like a poorly maintained public convenience but the taste is worse!" This is how the Asian fruit durian was first described to me by western experts living in Singapore. Unsurprisingly, I avoided it like the plague. Then I met some local connoisseurs, who hold this fruit in very high regard, they claimed, "The texture is like baked custard, while the smell and taste are simply indescribable but delicious".

I have discovered two restaurants on Olympia that carry durian products. Both are Southeast Asian. One carried durian ice cream. One carries a soft drink made from durian. When I asked the proprietor if he ate it, he replied, "Smells bad – tastes good!"

The importance of this research was in preparation for my trip to Singapore. Singapore is apparently the capitol of durian production. While there, locals confirmed everything I had heard with some embel-



Left to right in the photo above are Russ, Ms. Lim Siew Eng, deputy director (electronics) of Nanyang Polytechnic, and Lin Boom Huat, manager of Rohde and Schwarz, Singapore.

ishments of their own.

As for me, I have yet to marshal the courage to eat ice cream that smells bad but tastes good!



Ms. Lim Siew Eng (right), deputy director (electronics) of Nanyang Polytechnic, explains school of engineering programs to Russ.



Russ manning the NARTE booth at EMC Zurich in Singapore.

## NARTE at EMC Zurich in Singapore

NARTE has been working with representatives from Nanyang Polytechnic University and Rhode and Schwarz to establish a NARTE EMC certification base in Singapore. The 17th International Zurich Symposium in Electromagnetic Compatibility and Exhibition on EMC & RF/Microwave Measurements and Instrumentation was held in Singapore February 27 to March 3, 2006. NARTE was invited to staff a complimentary booth and present a workshop on certification at the show. The week prior, Nanyang Polytechnic presented a refresher course on EMC. As a result, 21 people signed on for the examination. Of those, 17 actually made it to the examination. The examinations are on their way to NARTE to be scored.



Sweating out the EMC examination



Russ explaining NARTE to a local engineer.

NARTE is continuing a dialog with Nanyang Poly to establish a proctoring site and eventually to export the EMC refresher course and certification to mainland China. Singapore is uniquely positioned to work with China because one of the national languages is English and another is Mandarin which is used throughout China. Singapore is a natural for translating the program.

## Other Headquarters Matters

### Is Your Certificate Current?

We find that people rely on their employer to pay for their certification renewal. There are two ways to check currency. The first is the annual renewal invoice sent to the certificate holder 45 days before the renewal date. The invoice goes to the individual certificate holder of record, not necessarily the person who pays for the renewal.

The second method to check is to call NARTE (toll free) at 1-800-89NARTE and ask if the account is current or when the renewal date is. This can also be done by email by writing to [narte@narte.org](mailto:narte@narte.org).

NARTE does send out follow-up notices if we do not hear from the certificate holder by their renewal date. If we do not get a response by the fourth notice, we transfer the account to the inactive file. The file can be resurrected at any time, but if more than five years pass, the candidate will have to re-examine to be reinstated.

### NARTE Exam at ESD Forum 2006 Philippines

The NARTE ESD examination was administered at the Philippine Electrostatic Discharge Forum 2006, held in Alabang, Muntinlupa City, Philippines, March 7-8. The NARTE exam was held at the conclusion of the forum on March 11. Twenty-one examinees pre-registered for the session. This exam session was coordinated with the assistance of a local NARTE-certified ESD engineer, Jess Munoz, of Intel Technology Philippines.

### Don't Drop Out – Take A Retirement Certificate

Your long history of certification is not something to give up casually. I encourage you to think about the options that you have available. If you are no longer able to work or are considered to be retired, you can apply for retired status. Retired status is less expensive (about \$25 per year) and still maintains your certification status. If you become active full time later, you would then switch back to active professional

standing. Details about retired certification are on the NARTE web site at [www.narte.org](http://www.narte.org).

If retirement is not the appropriate solution, but you cannot renew at this time, there is an alternative. You have five years from your last renewal to reinstate your certification to full standing. If you wait longer than five years, you would have to re-examine to be reinstated. You could opt to just wait until your circumstances change and renew then. NARTE will just move your file from active to inactive status while we wait. That would buy you some time to get back on track.

### DoD E3 Meeting

The Department of Defense Electromagnetic Environmental Effects community has been holding an annual meeting in the spring each year. The location varies. Last year NARTE was contacted both by the meeting organizer and the Army to attend this year. The Army invitation was particularly significant in that they had had a heated debate over certification that was closed when they realized that no one with the facts was available. NARTE attended both to support the Army and to scope out the value of participation. NARTE was the lead speaker for Army day but the party who had started the argument did not attend so questions were limited.

### KEC Holds Largest EMC Exam Session Ever

On February 24, the NARTE Japan EMC Certified Review Committee and Chapter held an EMC examination session in Tokyo, Japan. The Japan CRC administered the EMC Engineer exam to 153 applicants and the EMC Technician exam to 18 applicants. This is by far the largest number to sit for the NARTE EMC exam in one sitting.

Japan now has about 470 EMC and more than 200 product safety personnel certified. The administrator of the EMC certification, Mr. Kudo, formerly of Panasonic, plans to retire from KEC in March of 2007. NARTE staff will be meeting with Mr. Kudo and Mr. Tetsuo Ikeda (emeritus of the Institute of Technology) on May 4. He probably will not attend next year's review meeting. We are currently negotiating a protocol document to preserve the agreements we have made as a part of daily operations.

# PROPER USE OF THE NARTE STAMP

## A Caution on the Use of NCE – Don't Stamp Your Way Into a Hornet's Nest

By Russell V. Carstensen, PE, NCE

From time to time questions are raised about how to use (that is under what circumstances, not how to transfer the image of) the NARTE certification stamper. The purpose of the stamper is to mark your work with your credentials. Governments have restrictions on who can claim they are engineers (oddly enough there are no restrictions on who can claim to be a technician). This article will help outline the circumstances for acceptable use.

When you buy a stamper from NARTE you can stamp objects with your certification number and the NARTE logo. If you stamp a drawing to show your agreement or that you have reviewed a portion of the drawing (with a suitable annotation of just what your stamping means), that is not advertising your standing as an engineer to the public. That is an integral part of the drawing content. If you stamp anywhere on the title block, that is a declaration of professional competence and runs directly into the legal standing of the jurisdiction in which you work. If you stamp your stamper on a rest room wall (a la "for a hot time call this number"), that is advertising to the general public.

NARTE's function is to validate professional credentials of engineers and technicians in certain narrow specialties not directly covered by engineering registration laws. Our certification process involves a combination of education, work experience peer endorsement and examination. Generally, for engineers the requirement is nine years experience, four of which can be from an accredited college or university and the remainder in field practice. The examination is an eight-hour session of academic questions related to the field of practice. Peer endorsement consists of one supervisory person and three others each familiar with the candidate's experience and in support of the candidate's competence and character.

As assistance to our members, we provide ap-

propriate symbology to clearly and succinctly identify their standing as a NARTE certified professional. For example, we endorse the use of the initials NCE (NARTE Certified Engineer) or NCT (NARTE Certified Technician) as an expression of the individual's credibility in their chosen field. We have a policy statement on the use of the initials NCE and NCT (see side bar).

NARTE has offered copies of its logo for a number of years for member use on business cards and stationary and has sold an embosser for professional marking of individual products for more than ten years. In about April of 2000 NARTE began offering an ink stamper for the same purpose.

You need to know full well when stamping by a registered professional is required. The NARTE stamp is used to demonstrate that the page containing the stamp has been reviewed by a NARTE certified professional and the agency would stand by the contents and conclusions on the page.

To avoid confusion NARTE notifies each of the body of members that buy the stamper of our policy for its use and includes a copy of the policy with each future sale.

All states have some sort of engineering registration law. In essence these laws were created to protect the public. One form of that protection is for engineering products to demonstrate conformity to the registration law by being approved (stamped) by a registered engineer. The NARTE stamper is not intended to usurp, replace or avoid the use of a professional engineering stamp on drawings and other products so required by the individual state in which practice is conducted. Thus you must be careful to both be sure that an engineering registration stamp is present if required and to use your stamp in a fashion that does not leave an impression that the NARTE stamp is the necessary registered engineer stamp. Failure to do so can lead to disciplinary action on the part of the state board of registration in which the incident occurred, or by NARTE or both.

Not all engineering products require validation by a registered engineer. For example, the Federal government requires registration only in limited circumstances. Engineering work performed internally for a company building a device or commodity may not require a licensed engineer if the end product is the

device or commodity, not the engineering associated with it. It is your responsibility to know when stamping by a licensed engineer is required.

The NARTE stamper may be used to indicate or validate your professional standing. NARTE certification represents professional credentials of expertise and achievement to a recognized industry standard. NARTE certification is a standard of excellence in the field of telecommunications. If you are not sure how to use the stamper, here are some suggestions:

On a test or study report, stamp after the author's name and, if possible, include a brief statement on what NARTE certification represents, such as "NARTE certification provides professional credentials of achievement to a recognized industry standard" or "by this stamp, the details herein are endorsed by a communications specialist."

On a drawing, stamp in the area of the title block or in a general note with the explanation of what NARTE certification represents such as "NARTE certification provides professional credentials of achievement to a recognized industry standard."

On correspondence, if the NARTE logo is not used, stamp the lower left- or right-hand corner or below the signature. If the NARTE logo is used, it may be better not to stamp the document to avoid redundancy.

#### **NARTE Policy on Use of the Acronym NCE and NCT**

We receive many calls regarding the protocol of using the acronym NCE (NARTE Certified Engineer) and NCT (NARTE Certified Technician). Can it be used? Where can it be used? How should it be used? NCE and NCT are indeed very useable and very appropriate abbreviations, which represent distinctive achievement and expertise. They may be used after the name of the certified individual and/or in conjunction with the NARTE logo on business cards, forms, stationery or advertisement. Should you need a camera-ready copy of the NARTE logo, please advise the headquarters. We'll be happy to send the logo (and instructions for use) by mail or email at [narte@narte.org](mailto:narte@narte.org).

NARTE also offers, at our cost, both an embosser and ink stamper which depict the name of the certified individual

#### **NARTE Logo Use Policy**

Individuals certified by NARTE are encouraged to use the NARTE logo on their business cards and personal stationery. However, NARTE-certified individuals must adhere to the following rules:

- a. NARTE is registered with the United States Patent and Trademark Office. The ® symbol must be used with the word NARTE on first reference.
- b. Permission to use the NARTE logo is extended only while your NARTE certification is current. Permission to use this logo is automatically withdrawn if your NARTE certification is not renewed.
- c. The NARTE Certified individual's first and last name must also appear on any material that includes the NARTE logo.
- d. The typeface and graphic elements of the logo may not be re-typeset, altered, or modified in any way. All elements of the logo typeface and graphics must be clearly legible and recognizable.
- e. The words "Certified" and "Engineer/or Technician" are part of the logo and must be included.
- f. Preferred logo colors are dark blue (Pantone Matching System #289), black or reversed as silver or gold.

To guard against copy and/or misuse, the "NARTE Certified" logo is not to be posted to electronic media such as web sites or email. The NARTE Web logo should be used for linking purposes.

Thank you for adhering to these rules. Misuse of the NARTE logo may result in penalties, including loss of your NARTE Certification. Please contact NARTE at 1-800-89-NARTE if you have questions regarding a logo application.

NARTE, Inc.  
 P.O. Box 678  
 Medway, MA 02053  
 phone: 1-800-89-NARTE  
 fax: 508-533-3815  
 visit: [www.narte.org](http://www.narte.org)  
 email: [narte@narte.org](mailto:narte@narte.org)



## Gremlins in Your Medical Equipment

By Dr. Margot Stock

RF radiation is everywhere. We can't smell it, see it, hear it or touch it, yet we know it is out there. Medical diagnostic equipment provides unreliable results. Weird audio can be heard through testing equipment. Rock and roll music accompanies a medical diagnostic test. These gremlins are caused by high-power RF installations several miles away, such as AM, FM and shortwave radio, TV, microwave links and other such sources. Even local sources such as: EMT trucks, WLANs, MRI, and linear accelerators can have an impact.

**Case Study:** Several years ago a local neurologist was testing his new neuro conduction/EMG machine. When applying the concentric needle to his wrist, he noted that his arm was dancing to clearly heard rock music. As an amateur radio operator, he was quite conversant with radio frequency and understood that this behavior by the machine was connected in some way. This particular interference was traced by LBA engineers to an AM radio station a mile away. A telephone call to the builder leading to the installation of custom architectural shielding, by LBA, of the exam room solved the problem. On a further, interesting note, the engineer detected a signal of approximately 1 V/m emanating from the radio station. Federal Communications Commission (FCC) guidelines suggest that RF interference problems with electrical medical equipment can be elicited within the 1 V/m field. This case study was an obvious instance of RF interference, but not all interference is so easily detected.

Diagnostic tests are an invaluable tool in identifying patient problems. The results must be accurate if the diagnosis is to be correct. The tests are too expensive to be repeated, particularly if they are due to outside RF interference which can be prevented.

The handsome fellow in the title box is a Texas Air Pollution Board Gremlin.

**Case Study:** Several years ago, an incident occurred in the local hospital when an ultrasound machine used for tracking fetal growth developed noise in the display which obscured the picture. This problem was traced to a nearby radio station. Fortunately, the station went out of business before shielding was applied. The old adage that "an ounce of prevention is worth a pound of cure" is definitely true in the case of RF emissions and medical technology. It is never too early in the specifications or the design to plan for effective RF interference abatement.

Medical offices are, by virtue of their focus, usually clustered in specific areas in any urban setting. Frequently, this cluster of medical facilities includes a hospital with its abundance of medical technology. Urban areas are a hotbed of constantly evolving RF sources both local and ephemeral. This provides a distinct possibility of higher RF interference which will have an increasingly greater impact on the medical equipment within the area. In addition to the cases outlined above, RF interference might manifest itself as false positive or negative readings, transient, undesirable audio-on signals, aberrant readings on ECG from unshielded leads to name but a few. A convenient and free computer tool to provide an alert to local sources of high power radio interference may be found in the LBA Toolbox, <http://Lbagroup/toolbox.php>.

### Conclusion

Obviously, the answer to RF interference is appropriate shielding of equipment pieces or exam rooms containing diagnostic and recording equipment. The trick is to ensure that the passage of unwanted RF signals are small enough to cause no harm to medical equipment. New innovations in shielding make it possible to lower unwanted RF interference to manageable levels at a reasonable cost. Using architectural shielding such as fiber attenuation composites and conduction coatings can achieve attenuations of 40dB or more in existing facilities. While not to CIA specifications, such installations are often a cost-effective way to prevent RF ingress into your medical equipment. For small pieces of equipment, stand-alone Faraday cages such as LBA Technology's EMFaracage™ can be employed to block virtually all RF signals from entering. In addition to protecting your investment in expensive medical

equipment, a Faraday cage reduces maintenance costs, increases reliability and delivers more satisfaction to the patient.

If possible, shielding for specific spaces should be part of the original architectural design. If a potential source of interference is introduced into the area then a competent consulting engineer with experience in RF compatibility should be retained immediately. His role will be to study the electromagnetic environment and provide expert guidance in achieving compatibility between the new potential source of interference and the medical office with its diagnostic equipment. Prompt attention to this will prevent surprises in medical equipment behavior and reassure the owners that RF interference is not an angry gremlin sent to make life untenable.

LBA Group provides analysis of radio frequency interference problems, and, with its strategic partner The East Group, is involved in the design and commissioning of architectural shielding solutions.

Contact [www.LBAgroup.com](http://www.LBAgroup.com) or [www.Eastgroup.com](http://www.Eastgroup.com).

## Is Your Facility RF Green?

By Lawrence Behr, CEO

Electromagnetic energy is an environmental issue that is often overlooked. This invisible environmental factor should be considered as carefully as air and water quality.

Standards have been set for acceptable electromagnetic energy levels in the environment. Organizations, such as the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE), have studied and identified levels and time limits above which human exposure should be restricted.

As required by the National Environmental Policy Act (NEPA) of 1969, the Federal Communications Commission (FCC) has established standards and guidelines for evaluating the level of potential human exposure to emissions from licensed transmitters. OSHA's website states "...there are national consensus standards which OSHA could consider referencing in a general duty clause citation." Policies and

procedures should be put in place to reduce the potential for being challenged on these issues and for properly responding if you are challenged.

Electromagnetic energy is generated over a wide spectrum of frequencies from many different sources. The frequencies addressed in this article include extremely low frequency (ELF), radiofrequency (RF) and microwave (MW) radiation. The term "EME/RF" will be used here to refer to these frequencies.

ELF fields are produced by power lines, electrical wiring, and electrical equipment. RF and MW radiation is generated from many sources, including radios, cellular phones, the processing and cooking of foods, heat sealers, vinyl welders, high frequency welders, induction heaters, flow solder machines, communications transmitters, radar transmitters, ion implant equipment, and microwave drying equipment. These frequencies, along with visible and ultraviolet light, are known as non-ionizing radiation to distinguish them from the more dangerous X-rays, gamma rays and other higher energy level rays known as ionizing radiation. Ionizing radiation is not addressed in this article.

Establishing a policy and implementing procedures to consider, identify and document the factors that influence the electromagnetic environment will help ensure that workers and the general public are appropriately protected from any potential adverse effects resulting from excessive exposure. While most devices typically would not result in levels of exposure high enough to cause injury, it is nevertheless important to ensure that human exposures are maintained well below levels that are suspected to be potentially harmful.

Electromagnetic environment evaluation procedures should be consistent and complete. The FCC has established maximum permissible exposure (MPE) levels for human exposure to RF. They have published guidelines and procedures for evaluating RF exposure for the general public and for personnel performing occupational tasks in a controlled area.

While the focus of the FCC is strictly on transmitters that they license, OSHA is very much concerned with the workplace. OSHA has published their own guidelines, which state that they agree with those of the FCC and other standards organizations. In the area of occupational protection against EME/RF exposure, the OSHA guidelines are a very clear blueprint for the responsibilities of building facilities man-

agement. The General Duty Clause of OSHA states that an employer is required "to furnish to each of his employees, employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

It is becoming more common for building rooftops to be used as wireless base station antenna sites. A building manager should ensure that all wireless carriers located on such facilities comply with the requirements to assess and document the RF environment. These requirements are not restricted to each carrier's individual contribution to the RF environment, but mandate that they evaluate the cumulative effects of all RF sources at each site, identify areas where the MPE is exceeded in which their equipment contributes 5% or more of the MPE, and take appropriate action. That action could involve signage, barriers to restrict access, or other methods to alert people to the potential danger and prevent excessive exposure.

Forward thinking building managers might utilize internal resources or an independent third party firm to perform an EME/RF audit of any part of their facility where a potential tenant wants to install equipment that may generate EME/RF energy. This should be made a routine part of the due diligence process in evaluating the lease application and the cost included in those fees. In the case of wireless licensees, each should be provided with an updated copy of the results of the new study. The FCC rules require that each licensee consider the cumulative effects of all transmitters. Existing tenants are more willing to share the necessary information with a building manager or independent third party than with a potential new competitor.

The liability that results from an unknown or undocumented electromagnetic environment presents a unique risk-management problem. An innovative solution to the problem, using the rooftop example, is to perform an audit of RF sources. A RF sweep of the rooftop using industry-accepted test equipment can identify "hot spots" where high levels of RF are of concern. Then, a computer modeling study of the roof can be used to predict a "worst case scenario" and generate a color-coded map of the rooftop, with the safe, "green" areas in green, and other colors to alert personnel to any areas of concern. This map should be laminated and stored in a weather-resistant en-

closure that is well marked and placed where anyone entering the roof will see it, so that they will be aware of the environment.

Tens of thousands of occupational situations involve potentially hazardous exposure to non-ionizing radiation that could be at, near, or above recognized safety standards. Commercial and industrial uses outside the electronics industry continue to grow. High electromagnetic levels can affect the general population and, specifically, at-risk individuals.

While it is important to recognize that most facilities are safely within the MPE limits, it is also important to be able to provide some documentation to show how that was determined for your facility if you are asked to do so. For most buildings, this is easy and low cost. For facilities with more complex EME/RF environments, more detailed analysis is required; however, documenting the environment there is more important because challenges are more likely in such cases.

People with implanted pacemakers are of particular concern. The manufacturers of pacemakers usually provide specifications relative to the electromagnetic environmental levels where the device should not be used. Those responsible for environmental issues should be aware of workers and others who may have pacemakers and ensure that they are not allowed to enter an area where the electromagnetic environment is not compatible with the pacemaker. RF energy can also affect the operation of hearing aids.

In addition to effects on humans, sufficiently high levels of RF energy can interfere with other electronic equipment such as computer systems, wireless devices, medical equipment (defibrillators), and RFID systems. Often, these types of equipment are vital to providing workplace safety. As with all environmental concerns, the electromagnetic environment must be managed with knowledge and responsibility.

Electromagnetic environmental safety is a risk management issue. By recognizing it as such, facility management is taking positive steps to protect employees and visitors as well as avoiding potential litigation should an incident occur. The guidelines established by OSHA provide a clear blueprint for the responsibility of building facilities' managers. The first step is to establish a written policy for documenting and dealing with these issues.

It is also important to establish a procedure for

documenting all potential sources of electromagnetic energy at and nearby the facility. Conducting periodic reviews will ensure that the information is current. Obtaining an expert evaluation and opinion as to the need for a detailed electromagnetic/RF environment audit is a prudent step. If recommended, study of the electromagnetic environment should be performed. Depending on the facility, this may include measurements, theoretical modeling, or a combination of the two. It is vital to correct any deficiencies noted, post signage where appropriate, and restrict access where needed. OSHA's policy states that employers who have people working around devices which produce radiofrequency/microwave radiation need to be sure that those devices are properly shielded to prevent leakage of radiation.

The FCC sets forth two tiers of MPE levels, one for general population/uncontrolled environments and another for occupational/controlled environments. Where electromagnetic hazards may exist, awareness training should be provided to personnel who find it necessary to enter the area. In facilities where RF exposure is high, specific areas of concern can be identified and access to those areas can be restricted or controlled.

In facilities where it is more desirable to utilize the less restrictive occupational/controlled exposure limits, certain requirements must be met. These include RF safety awareness training for anyone entering such facilities. Procedures should be instituted for working in the vicinity of the RF sources that will prevent exposures in excess of the guidelines. Since the MPE limits are based on time averaging, restricting the time an individual could be near an RF source is one example of a policy that could prevent excessive exposure to RF radiation. It is necessary to inquire of prospective new tenants regarding planned equipment that may contribute to the EME/RF environment and evaluate the cumulative threat thereof.

Management should also determine if prospective new tenants plan to use equipment that may be negatively impacted by the existing EME/RF environment. EME/RF emissions can cause potential hazards to both humans and the operation of equipment. In addition to the impact on personnel, the emissions from one device may have a deleterious effect on other devices in the area. In medical-related facilities or other facilities used for sensitive testing, there may also be adverse effects on test results.

Just as there are safety precautions for operating a microwave oven, such as not operating it when empty, checking to see that the door seal is tight and using extreme caution if you have a pacemaker, there are safety precautions for the operation of business, industry and health-related facilities. While it is important to know what the precautions are, it is also important to take action to protect the environment and those who work within the environment from the potential hazardous effects of EME/RF emissions. EME/RF radiation is an important safety aspect of facility management. By using professionals to survey the facility and determine the levels of EME/RF radiation, providing formal training of employees and adequate posting of hazardous areas, all personnel within the facility can be protected against excessive levels of EME/RF.

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# NARTE Administrative Page

## OFFICERS, DIRECTORS, PRINCIPAL STAFF and KEY POINTS OF CONTACT

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**H. Stephen Berger, NCE**  
PRESIDENT (2005)  
Georgetown, Texas

**Michael W. Hayden, NCE**  
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Rockford, Illinois

**Garry R. Gorr, NCE**  
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Libertyville, Illinois  
KD9OG

**John Christensen, NCE**  
SECRETARY (2005)  
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### DIRECTORS

**Lawrence Behr, NCE**  
DIRECTOR (2006)  
Greenville, NC  
K4JRZ

**Dave Case, NCE**  
DIRECTOR (2005)  
North Canton, Ohio  
KB8GX1

**Glen Watkins**  
DIRECTOR (2008)  
Austin, Texas

**Kimball Williams, NCE**  
DIRECTOR (2005)  
Southfield, Michigan  
N8FNC

### PRINCIPAL STAFF

**Russell V. Carstensen, P.E., NCE**  
EXECUTIVE DIRECTOR  
Olympia, Washington  
**Phone:** (360) 753-5958 (PST)  
**FAX:** (360) 754-8334 (24 hrs)  
**Email:** carstensen@narte.org

**Terri Marinucci**  
OPERATIONS DIRECTOR  
Medway, Massachusetts

**Tom Chesworth, PhD, P.E., NCE**  
NARTE NEWS EDITOR  
Boalsburg, Pennsylvania  
W3IA

### KEY INFORMATION/ POINTS OF CONTACT

**NARTE Headquarters:**  
NARTE Membership  
Qualifications  
Corporate and Personal  
Certification Literature  
NARTE and FCC Test  
Locations  
General Administration

**WHERE:** NARTE, Inc.  
167 Village Street  
Medway, MA 02053

**WHEN:** Hours 9-5 Eastern Time

**WHO:** Terri Marinucci  
Russ Carstensen

**PHONE:** (508) 533-8333  
**800#** (800) 89-NARTE

**FAX:** (508) 533-3515 (24 hrs)  
**E-Mail:** narte@narte.org

### NARTE News

Articles, Publication, Letters to the Editor and Advertising.

**WHERE:** 913 Tressler Street  
Boalsburg, PA 16827

**WHEN:** 8-5 (Eastern Time)

**WHO:** Tom Chesworth  
**PHONE:** (814) 466-6559

**Fax:** (814) 466-2777  
**E-Mail:** nartenews@7ms.com

### NARTE Net

**E-Mail:** narte@narte.org  
**Website:** www.narte.org

*Feel free to contact your officers and staff members by email at [narte@narte.org](mailto:narte@narte.org)*

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