

# The Sensor

**Combating the Negative Impacts of Volatile Anesthetic on the Environment by Embracing New Technology**

Page 7

## IN THIS ISSUE:

**New Executive Director: Jennifer Rzepka, CAE 5**

**Regional Reports 14**

**2024 Annual Conference & Anesthesia Tech Expo Save-the-Date 19**

**asatt**

AMERICAN SOCIETY OF  
ANESTHESIA TECHNOLOGISTS  
AND TECHNICIANS

The right  
monitoring  
makes a  
difference –  
for all your  
patients’  
differences



## Designed for patient diversity

Skin pigmentation has been shown to interfere with the clinical measurement of tissue oxygenation measures<sup>1</sup> – which is why ForeSight sensor was designed with patient differences in mind.

With both a unique sensor design and five wavelengths of near infrared light (NIRS), ForeSight sensor has been demonstrated to accommodate for the melanin present in a patient’s skin.<sup>2</sup>

### ForeSight tissue oximetry system:

- Accounts for individual differences, including skin tone, size, skin-to-cortex distance and acuity
- Delivers absolute cerebral and somatic tissue oximetry values without requiring a preinduction baseline
- Integrates with HemoSphere monitor



Learn more at [Edwards.com/ForeSight](https://www.edwards.com/ForeSight)

### References

1. Sun X, Ellis J, Corso PJ, Hill PC, Chen F, Lindsay J. Skin pigmentation interferes with the clinical measurement of regional cerebral oxygen saturation. *Br J Anaesth*. 2015;114(2):276-80.
2. Stannard B, Levin MA, Hung-Mo L, Weiner M. Regional cerebral oximetry is consistent across self-reported racial groups and predicts 30-day mortality in cardiac surgery: a retrospective analysis. *J Clin Monit Comput*. 2021;35(2):413-21.

**CAUTION: Federal (United States) law restricts this device to sale by or on the order of a physician. See instructions for use for full prescribing information, including indications, contraindications, warnings, precautions and adverse events.**

Edwards, Edwards Lifesciences, the stylized E logo, ForeSight, and HemoSphere are trademarks of Edwards Lifesciences Corporation or its affiliates. All other trademarks are the property of their respective owners.

© 2023 Edwards Lifesciences Corporation. All rights reserved. PP-US-6519 v4.0

Edwards Lifesciences • One Edwards Way, Irvine CA 92614 USA • [edwards.com](https://www.edwards.com)



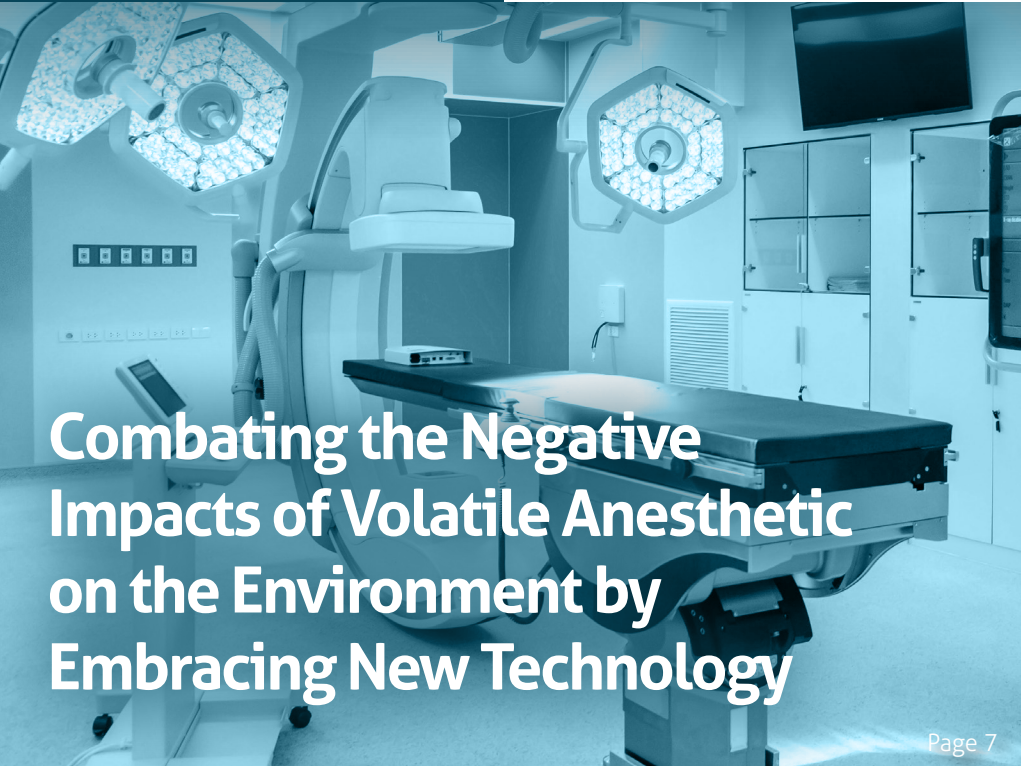
Edwards



# Contents

---

## Features



**Combating the Negative Impacts of Volatile Anesthetic on the Environment by Embracing New Technology**

Page 7



**2024 Annual Conference & Anesthesia Tech Expo Save-the-Date**

Page 19

---

## In This Issue

**President's Letter** 2

**New Executive Director: Jennifer Rzepka, CAE** 5

**Combating the Negative Impacts of Volatile Anesthetic on the Environment by Embracing New Technology** 7

**Regional Reports** 14

**2024 Annual Conference & Anesthesia Tech Expo Save-the-Date** 19

---

## Editorial Board

Otoniel Castillo

David Foster

Bryan Fulton

### ASATT Office

**414-295-9220**

[asatt@asatt.org](mailto:asatt@asatt.org)

6737 W Washington St

Suite 4210

Milwaukee, WI 53214

[www.asatt.org](http://www.asatt.org)

---

## ASATT Executive Committee/Officers

**President/Immediate Past President**

Bryan Fulton, Cer.A.T.T.

**President Elect**

Greg Farmer, Cer.A.T.

**Secretary**

Bryan Cobangbang, Cer.A.T.

**Treasurer**

Sara Paraspolo, Cer.A.T.T.

# Perspective

## PRESIDENT'S LETTER



**Dear ASATT Members,**

I am delighted to share with you the tremendous success of our recent Pasadena Conference, which exceeded all expectations. With over two hundred attendees and more than 25 speaking opportunities, the event was a testament to the dedication and enthusiasm

of our vibrant community. Find more photos on the next two pages (page 3-4).

First and foremost, I want to express my sincere gratitude to each attendee, speaker, and vendor who played a crucial role in making the conference a resounding success. Your active participation and commitment to advancing anesthesia technology were truly inspiring, and we are immensely thankful for your contributions.

A special note of appreciation goes to our Platinum-level sponsors, Sharn, Simvana, and Edwards, whose generous support significantly contributed to the success of the Pasadena Conference. Your commitment to our association is invaluable, and we look forward to continuing this partnership.



Edwards

**SHARN** INC.

**SIMVANA**

I'm excited to announce that next year's conference will be held at the Omni Hotel in downtown Oklahoma City from September 25-28, 2024. Save the date as we anticipate another fantastic event filled with networking, learning, and collaboration.

In other news, our Professional Practice Survey has garnered an impressive response, with nearly 600 participants so far. If you haven't already, I encourage you to participate in this important survey. Your input is invaluable to shaping the future of our profession. As a token of our appreciation, participants will receive 1 free CEU for completing the survey. The survey closes on 12/31/2023, so please take a moment to share your insights.

**asatt** AMERICAN SOCIETY OF ANESTHESIA TECHNOLOGISTS AND TECHNICIANS

**SCOPE OF PRACTICE SURVEY**  
**FINAL DAYS TO RESPOND**

**Earn 1.0 CEU for Participating!**

**Deadline: SUNDAY, December 31, 2023**

As we approach the end of the year, it's also a crucial time for recertification. Don't forget that recertification is due by 12/31/2023. Ensure that your credentials remain up-to-date to continue contributing to the field of anesthesia technology.



Finally, as we enter the holiday season, I want to wish you a safe and joy-filled celebration. May this time bring happiness, warmth, and moments of relaxation.

Thank you for your ongoing commitment to ASATT, and I look forward to our continued success in the coming year.

**Bryan Fulton, M.Ed., Cer.A.T.T.**

*ASATT President*

[president@asatt.org](mailto:president@asatt.org)



AMERICAN SOCIETY  
OF ANESTHESIA  
TECHNOLOGISTS  
AND TECHNICIANS

If your Cer.A.T. or Cer.A.T.T. expires 12/31/23:

**RECERTIFY NOW**

ALL your Continuing Education Units (CEUs)  
must be earned before year-end (*no exception*):

**20 CEUs for Cer.A.T. / 30 CEUS Cer.A.T.T.**

***Don't miss the deadline!***









# From the **NEW** Executive Director



**JENNIFER RZEPKA, CAE**

HELLO ASATT!

The past two months have been quite a wild whirlwind since the 34th Annual Conference in Pasadena, California.



On October 26, 2023, former Executive Director, Mr. Mike McManus, retired, and during the Annual Conference the ASATT Board of Directors unanimously voted to approve me entering this role to serve the Association. We are all grateful for Mike's past leadership and contributions, and I am thrilled

to be charged with the Executive Director position for this incredible organization.

I have personally been managing non-profit organizations for 23 years and have a sincere passion for the work. In just these past two months I've been digging into the structure and organization of the recently launched website and more to help get ASATT's operations onto solid foundation so we can grow in many ways.

As many of you are certified in anesthesia, I too hold the equivalent title in my own profession: CAE (Certified Association Executive). Certification and Accreditation are very important to me on a personal and professional level. In addition to being certified, my company, which manages dozens of non-profits, is also Accredited in accordance with our profession's ANSI standard. My understanding and reverence for these continued professional developments should benefit ASATT greatly as we continue to evolve through the Practical Experience Pathways program and more.



To launch into the new year well, there are many plans already in place! Please see the 2024 Calendar on the next page and mark your own calendars for these great ways to engage with fellow ASATT Members:

## 2024 Annual Conference & Anesthesia Tech Expo

Save the dates: Wednesday, September 25 - Saturday, September 28, 2024 at the Omni Oklahoma City Hotel in Oklahoma City, Oklahoma. [The Exhibitor Prospectus is already available!](#)



## 2024 Quarterly Webinars


Earn 4 CEU for each webinar you attend:  
March 23rd; June 22nd ; August 10th; December 14th

## 2024 Sensor Dates

Consider submitting an article to one of next year's Sensor publications – you can earn 5 CE for that contribution!

I look forward to working with my colleagues in the ASATT office to serve the members of ASATT efficiently and enhance the features of the website to make that experience positive for everyone in 2024.

Thank you for entrusting me with the role of Executive Director, I look forward to meeting many of you in the weeks and years to come!

**Jennifer Rzepka, CAE**  
ASATT Executive Director  
j.rzepka@asatt.org 

# 2024 ASATT CALENDAR

## 2024 ANNUAL CONFERENCE

### 2024 Annual Conference & Anesthesia Tech Expo

Wednesday, September 25 - Saturday, September 28, 2024

Omni Oklahoma City Hotel  
Oklahoma City, OK

[Download Exhibitor Prospectus](#)

## 2024 WEBINARS

### Quarter 1

March 23, 2024

### Quarter 2

June 22, 2024

### Quarter 3

August 10, 2024

### Quarter 4

December 14, 2024

## 2024 SENSOR

### Quarter 1

March 16, 2024 – Content Due

April 6, 2024 – Distribution Date

### Quarter 2

June 15, 2024 – Content Due

July 6, 2024 – Distribution Date

### Quarter 3

September 21, 2024 – Content Due

September 28, 2024 – Distribution Date

### Quarter 4

November 30, 2024 – Content Due

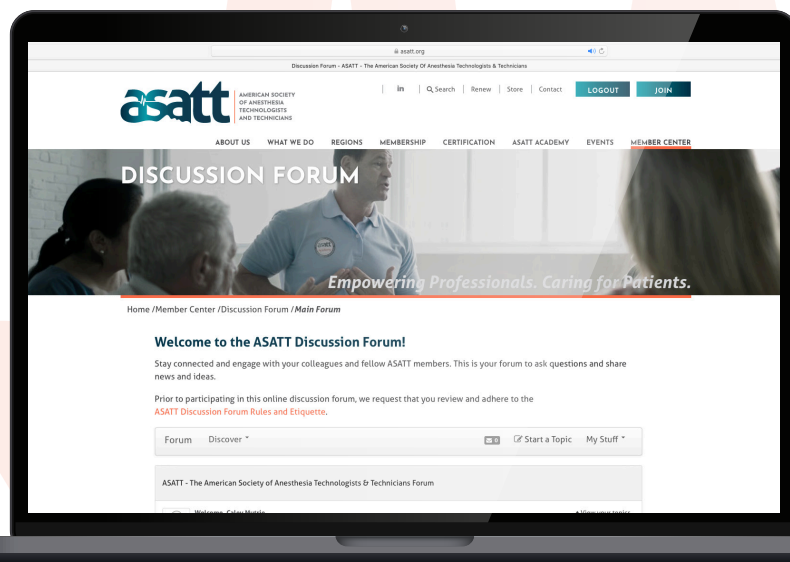
December 21, 2024 – Distribution Date

# Share. Inquire. Learn.

## ASATT's online Discussion Forum is available for members to connect and share!

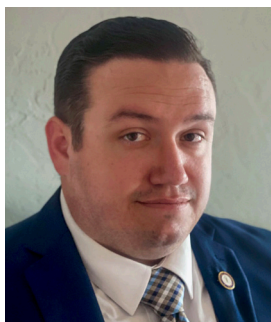
ASATT has an online Discussion Forum that members can support each other through the sharing of vital resources, knowledge and experiences, and to seek answers to questions and concerns.

[Join the Conversation!](#)





# Combating the Negative Impacts of Volatile Anesthetic on the Environment by Embracing New Technology



**BRYAN FULTON,  
M.ED., CER.A.T.T.**  
PROFESSOR,  
DIRECTOR OF LABS  
& SIMULATIONS  
OCCC ANESTHESIA  
TECHNOLOGY

### ABOUT THE AUTHOR

Bryan Fulton is a Professor of Anesthesia Technology at Oklahoma City Community College (OCCC) and Director of Labs and Simulations at OCCC. When he is not teaching at college, he volunteers with ASATT and the CoA-ATE, most recently serving as the ASATT's president. Bryan is a doctoral student at Baker University and focuses his research on the impacts of clinical instructors on the persistence and retention of students in allied health professions programs. He is a father to four wonderful children and loves spending time with his wife and family, exploring all Oklahoma offers.

### DISCLOSURES

This article contains references to particular companies and specific products. The author wishes to disclose that they have neither financial nor non-financial affiliations with the companies or products mentioned in this article. The primary aim of this article is to inform readers about ongoing efforts in developing technologies to reduce the environmental impact of volatile anesthetics.

### OVERVIEW

Over the past several decades, a global cultural shift has focused on addressing climate change. This shift has led to a concerted effort by various industries to modify traditional manufacturing techniques and overall operations to reduce the impact of CO<sub>2</sub> emissions on the atmosphere. For instance, the proliferation of electric vehicles and the expansion of solar services are popular examples of industries striving to be more conscious of their impact on the global climate.

However, several industries are also making efforts to enhance their emissions footprint concerning the atmosphere. Notably, healthcare, specifically the perioperative environments, are reshaping how they deliver surgical services to minimize their environmental impact. This article aims to explore the trends in perioperative technology that have been designed to reduce their impact on the climate.

## BACKGROUND

According to the National Centers for Environmental Information, global temperatures have risen by two degrees since 1880. More notably, since 1981, the average increase in global temperatures has accelerated to 0.32°F per decade, marking a 128% increase from the average decade increase prior to 1981 (Lindsey & Dahlman, 2023). The primary contributor to this global warming is increased atmospheric carbon dioxide levels. As scientists continue to predict rising temperatures in the coming decades, other concerns related to climate care, such as the impacts of gases other than carbon dioxide on the climate, come into focus.

Within the field of anesthesia, a significant focus has been placed on the environmental impact of volatile anesthetics. For instance, research into the effects of Desflurane on global warming has revealed that one bottle of Desflurane produces the same global warming effect as burning 440 kg of coal (NHS, 2021). This equivalence is also on par with driving a car for 3,200 miles (Heron, 2023). Such an impact means that Desflurane is significantly more harmful than the more commonly known greenhouse gases and is “2,500 times more impactful than carbon dioxide” (Heron, 2023).

This research highlighting the considerable negative impacts of Desflurane has prompted numerous institutions to remove Desflurane from their operating rooms. For example, the National Health Service, the United Kingdom’s government-funded healthcare provider, has ceased using Desflurane at 40 health systems (NHS, 2023). Similarly, domestically, we are witnessing comparable trends in the removal of Desflurane from the operating room, with the University of Pittsburgh Medical Center (UPMC) committing to the complete removal of Desflurane from all 40 hospital systems by the end of the year (DeWitt, 2023). Desflurane is one of the most prominent examples of the perioperative environment’s shift towards greater awareness of its impact on the climate.

## AN OVERVIEW OF DESFLURANE

Volatile anesthetics are inhaled anesthetics used to induce or maintain stage three general anesthesia. All volatile anesthetics used today, except for Nitrous oxide and Xenon, are ether derivatives and are considered halogenated. This means the chemical complexes are formed from halogen elements bound to carbon or oxygen. Examples of halogens used to make contemporary volatile anesthetics include fluorine and chlorine.

Structurally, Desflurane is almost identical to its cousin anesthetic agent, Isoflurane, with the only difference being the number of fluorine atoms—six, with the sixth fluorine replacing the chlorine atom found in Isoflurane. Desflurane has distinctive physical properties, including a pungent smell, which makes it unsuitable for inhalation inductions. Furthermore, its volatility makes it more expensive to use. Desflurane will boil at a standard room temperature of 22 degrees Celsius (Özelsel, Sondekoppam, & Buro, 2019). This means that to use it, the agent has to be superheated well above its partial pressure of 669mmHg to an extreme pressure of over 1300mmHg to ensure accurate administration to patients undergoing surgery. To put this into perspective, the standard boiling pressure on Earth is 760mmHg. This means that Desflurane, left unabated, is 88% of the standard boiling pressure, and within a vaporizer, it is superheated to 71% above the standard boiling pressure to ensure safe delivery to patients. These factors contribute to Desflurane being an energy-intensive anesthetic to maintain, making its stabilization requirements expensive and environmentally impactful.

Despite its complexity of use, Desflurane is a valuable anesthetic for specific situations, justifying its continued use in the operating room. For example, despite the requirement of using a six-percent delivery to reach 1-MAC (the amount of anesthetic required to render 50% of the population under general anesthesia), Desflurane reaches its peak alveolar concentration much faster than its cousin agent, Isoflurane, making it easier to control in the patient (Butterworth et al., 2022). Desflurane’s ability to reach peak concentration also results in quicker patient emergence from anesthesia compared to other volatile anesthetics (Butterworth et al., 2022).

Clinically, Desflurane has several considerations, including the onset of tachycardia in higher doses, which is thought to result from a vagolytic effect (Pardo, 2023). A positive aspect of Desflurane is its lack of interaction with the renal



system. Unlike other volatile anesthetics, Desflurane does not cause an increase in serum fluoride levels, meaning it is not typically associated with adverse impacts on the renal system. The same is true for Desflurane's impact on the hepatic system, where liver failure from Desflurane is less than 1 in 1,000,000 (Pardo, 2023). Cardiovascular impacts of Desflurane are similar to those of Isoflurane, with noted vasodilation qualities and a lowering of cardiac index. However, as mentioned previously, Desflurane is seen to produce transient tachycardic episodes in higher doses administered rapidly, a characteristic not found in Isoflurane (Butterworth et al., 2022).

## WHAT MAKES DESFLURANE SO HARMFUL TO THE ENVIRONMENT?

As previously discussed, Desflurane has legitimate uses in the operating room, primarily due to its ability to be controlled efficiently, thanks to its low blood/gas coefficient, resulting in faster emergence times. However, a significant drawback is its instability at low temperatures, requiring external heating for thermoregulation during anesthesia.

With an increased focus by perioperative teams worldwide on being responsible stewards of our climate, Desflurane has come under scrutiny for its significant negative impact on global warming. In 2014, Vollmer found that Desflurane accounted for a concentration of 0.30 parts per trillion in the atmosphere, as samples were taken from the northern hemisphere (American Geophysical Union, 2015). This concentration may seem small, especially when compared to the atmospheric concentration of carbon dioxide at 400 parts per million. However, it is essential to remember that despite its low atmospheric concentration, Desflurane is 2,500 times more impactful on global warming (Özelsel, Sondokoppam, & Buro, 2019).

Moreover, according to Sherman and Chesebro (2022), Desflurane's greenhouse gas emissions are 40 times greater than those of Isoflurane and Sevoflurane, partially explaining why significant levels of Desflurane were found in the atmosphere during gas sampling in 2014 in the northern hemisphere. Another concerning aspect of the harmful effects of Desflurane is its lifespan in the atmosphere. When Desflurane is evacuated from operating rooms via scavenging systems, the expelled gases do not break down quickly but remain intact in the atmosphere for years. Among the three primary ether-derived anesthetics used in the United States, Desflurane remains in the atmosphere for a minimum of ten (10) years, with some research indicating that it may persist for up to 21 years. This far exceeds the figures for Isoflurane,

which has a mean of 3.6 years and a range of 3-6 years. Additionally, Sevoflurane has a mean of 1.2 years and a range of 1-5 years (Varughese & Ahmed, 2021; Yasny & White, 2012). Considering that minimal metabolism occurs when using volatile anesthetics, most of the gases used during surgery exit the patient and enter the atmosphere directly via the scavenging system. Recent advancements aimed at mitigating the impact of volatile anesthetics and reducing waste have given rise to low-flow anesthesia as a technique to minimize the adverse effects of volatile anesthetics while avoiding their complete elimination from use in anesthesia (Varughese & Ahmed, 2021).

## WHAT DEFINES LOW-FLOW ANESTHESIA

At its base level, low-flow anesthesia delivers fresh gas flow below a patient's minute volume. This process of running a minimal gas flow allows for the anesthetic agent to be recycled (Honemann & Mierke, n.d.). The end goal is only to deliver the minimum needed oxygen concentration to prevent hypoxia (Upadya & Saneesh, 2018). According to GE HealthCare, to use Low-flow techniques, the fresh gas flow must be "less than half the minute ventilation of the patient, which is most often less than 3.0L/min on average in a normal adult" (GE HealthCare, 2020). This low flow aims to reduce waste and reuse the volatile anesthetic. If you recall, earlier in the article, volatile anesthetics are poorly metabolized in the body, meaning the exhalation contains nearly the same amount of anesthetics in the inspiratory phase. This process involves recycling the anesthetic agent back into the patient instead of flushing it with high-flow oxygen into the scavenger. The low-flow approach leverages the inherent chemical qualities of the agent, allowing for its reuse and minimizing its release into the atmosphere. (Honemann & Mierke, n.d.).

The benefits of low-flow anesthesia are numerous; the reduced flow results in less oxygen and volatile anesthetic waste. In fact, in states of high-flow anesthesia, rates above 5.0L/min result in wasting at least 80% of the administered volatile anesthetic (GE HealthCare, 2020). From a patient care perspective, low-flow anesthesia has several advantages, the primary being the preservation of heat and humidity, which optimizes gas exchange in the lungs and preserves the patient's temperature (Upadya & Saneesh, 2018). Within the perioperative space, low-flow anesthesia has also been found to protect clinicians by avoiding overexposure to the agents through operating room pollution. This directly impacts anesthesia technologists by limiting their exposure

during maintenance phases, such as refilling the vaporizers. By utilizing low-flow anesthesia, the vaporizer needs less frequent refilling (Upadya & Saneesh, 2018). From a climate perspective, the benefits of low-flow anesthesia are apparent; recycling the volatile anesthetics sends fewer anesthetics to the atmosphere, ultimately limiting the greenhouse gases that damage the ozone layer (Upadya & Saneesh, 2018).

You may be asking yourself, hasn't low-flow anesthesia been around since the development of the circle system? The answer to this question is complex, but the answer is yes at its core. However, the complex nature of maintaining the minimum delivery of oxygen made proper low-flow anesthesia nonideal because of the constant changes in delivery for specific patients and changing conditions, coupled with complex formulas to ensure appropriate delivery. However, in recent years, anesthesia machine manufacturers have answered this problem with technological advances to make low-flow anesthesia practical and safe.

## TECHNOLOGIES BEING USED TO CURB THE EFFECTS OF VOLATILE ANESTHETICS ON THE ENVIRONMENT

### ***GE HealthCare End-tidal Control (Et Control) software***

As healthcare technology continues to advance, and with a growing emphasis on reducing our carbon footprint, anesthesia machine manufacturers, anesthesia researchers, and other companies are actively developing new technologies to minimize the environmental impact of wasted anesthetic gases.

GE Healthcare, the maker of various anesthesia machines widely used across the country and holding the largest market share for anesthesia machines in the United States, is one such company dedicated to innovating its technology to mitigate the environmental effects of anesthesia.

This year, GE Healthcare partnered with the University of Michigan to upgrade the entire fleet of Aisys CS2 anesthesia machines, totaling 171 units (GE Healthcare, 2023). The objective was straightforward: integrate End-tidal control software into all machines to align with the University's long-term commitment to reduce its climate impact as part of its Green Anesthesia Initiative. The addition of this new software marks a significant step toward the University of Michigan's goal of reducing "greenhouse emissions from anesthetic gases by 80%" (UM Anesthesiology, 2022). According to GE

Healthcare, the University of Michigan is the first hospital system in the United States to implement this software in its operating rooms (GE Healthcare, 2023). However, the Et Control software is not entirely new and has been widely used in Europe for over a decade (GE Healthcare, 2023).

The Et Control software is a multimodal system that enables the provider to set an end-tidal goal. The software then conducts analyses and adjusts delivery to ensure the precise administration of oxygen and volatile anesthetic (GE Healthcare, n.d.). The software relies on five safety mechanisms: Et Control Supervisor, Et Control System Check, Et Control Fresh Gas Sample Check, Et Control Increased Flow, and Et Control Auto Exit (GE Healthcare, n.d.). These five mechanisms collaborate to continuously inspect the machine for leaks and proper calibration during active use on patients (GE Healthcare, n.d.). For example, the Et Control Fresh Gas Sample Check operates in the background every three minutes, lasting approximately 13 seconds (GE Healthcare, n.d.). Additionally, if the software cannot correct any faults detected by the other four safety mechanisms, the system will automatically exit the Et Control mode using the Et Control Auto Exit mechanism (GE Healthcare, n.d.).

It is crucial for anesthesia technicians and technologists to be familiar with the five mechanisms used to ensure the system's proper operation. Additionally, they should understand how to program the system before use. When utilizing the Et Control software, the technician or technologist needs to be aware of the provider's desired End-tidal Oxygen (EtO<sub>2</sub>) value for the patient and the desired End-tidal Anesthetic Agent (EtAA) for the patient (GE Healthcare, n.d.). This is accomplished through the machine monitor, where the Et Control software is activated by selecting the start icon and then specifying the end-tidal targets on the lower portion of the screen (GE Healthcare, n.d.).

### ***Mindray's A Series Advantage Optimizer for Low-flow Anesthesia***

Similar to the GE Et Control system, the Mindray Optimizer seeks to lessen emissions and optimize the utilization of gasses via a low-flow delivery. The Optimizer can be found on the A7 and WATO EX-65 Pro anesthesia machines (Mindray North America, 2019). Unlike the GE system, the Optimizer does not have an automatic system; instead, the Optimizer uses its software to analyze the current oxygen and volatile anesthetic usage and then provides a recommended or target delivery for both anesthetic agent and fresh gas flow.



On a tangential note, the Optimizer system also provides the anesthesia team with a cost per hour, allowing the system to not only provide a reduction in emissions but also a quantifiable way of showing the low-flow systems cost savings for the institution (Mindray North America, 2019).

For the anesthesia technologist, the operations of the Optimizer are different from the GE System. However, there are some essential items to be aware of for its safe operation. In order for the Optimizer to be functional, three conditions on the machine must be met. One, the electronic flow control system (EFcs) must be active and operational. The EFcs is an electronic flowmeter system that relies on solenoids attached to sensors, whose purpose is to control the flow of gas and monitor actual flows against the desired settings. Two, the External AG module must be active and operational (Electronic Flow Control System-EFCS - Mindray WATO EX-55Pro Service Manual [Page 66], 2020). The External AG module is a system that analyzes the gases in the machine and displays the MAC value of the agent in the patient. Third, for the Optimizer to be functional, the machine must be in mechanical ventilation mode.

In most cases, if those three items are addressed, the Optimizer will function and provide recommendations for low-flow delivery. However, the system will be disabled if certain situations occur. For example, the Optimizer will not be enabled if the “circuit leak test is skipped or has failed” (Mindray North America, 2016). Furthermore, if specific alarms engage, the Optimizer will deactivate.

These alarms include:

- Apnea
- Apnea > 2 min
- Apnea CO2
- Flow Sensor Failure
- Check Flow Sensors
- Pinsp Not Achieved
- Vt Not Achieved
- Patient Circuit Leak
- The CO2 Absorber Canister not Locked
- Ventilator Comm Stop
- Drive Gas Pressure Low
- AG Hardware Error
- External AG Self-Test Error
- AG Hardware Malfunction
- AG Init Error
- AG No Water trap
- AG Change Water trap
- AG Comm Stop
- AG Airway Occluded
- AG Zero Failed
- External AG Module Disconnected
- Incompatible AG Software Version

In summary, the Mindray Optimizer allows clinicians to optimize volatile anesthetics without complex calculations to meet the patient’s metabolic demands.

## EMERGING TECHNOLOGIES FOR CONTROLLING VOLATILE ANESTHETICS

While low-flow anesthesia and the software developed by machine manufacturers have provided the most streamlined approach to prevent the excessive release of greenhouse gases, other emerging technologies may find their way into operating rooms in the coming years. One such technology, similar to low-flow, relies on older concepts to address wasted gases, specifically absorption (Ang et al., 2019). When we think of anesthetic absorption, we often associate it with charcoal filters used for malignant hyperthermia. However, activated charcoal is being explored as a method for absorbing anesthetics in non-emergency situations. Another example of absorption technology being deployed is Deltasorb. Similar to a carbon dioxide absorber, Deltasorb operates through filtration to capture the anesthetic agent. The agent is subsequently re-liquified and stored for recycling later (Wasiwicz, Grewal, 2016; Yasny & White, 2012).

## CONCLUSIONS

The past few decades have seen a global shift towards addressing climate change, resulting in various industries adapting their practices to reduce CO2 emissions. Within the perioperative environment and anesthesia, a concerted focus has been on limiting the greenhouse effect of volatile anesthetics. As global temperatures rise from rising carbon dioxide levels and other greenhouse gases, a closer look at limiting the negative impact of volatile anesthetics on the environment is warranted.

Desflurane, despite its clinical benefits, poses significant challenges due to its disproportionate impact on global warming. Fortunately, technological advances identified safe ways to utilize this gas, most notably in low-flow anesthesia.

As the healthcare industry continues to address climate change, these technological advancements and shifting practices reflect a shared commitment to environmental responsibility.

FIGURES

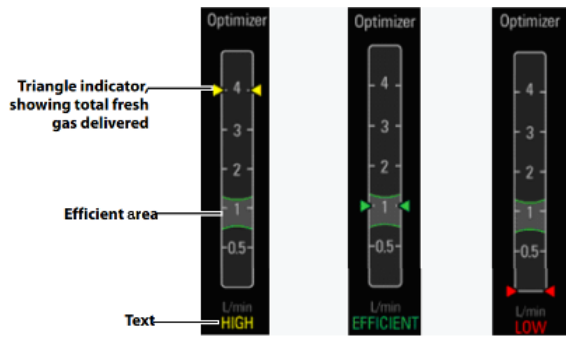


FIGURE 3-19 OPTIMIZER® Indication States

Mindray North America A7 Instruction Manual

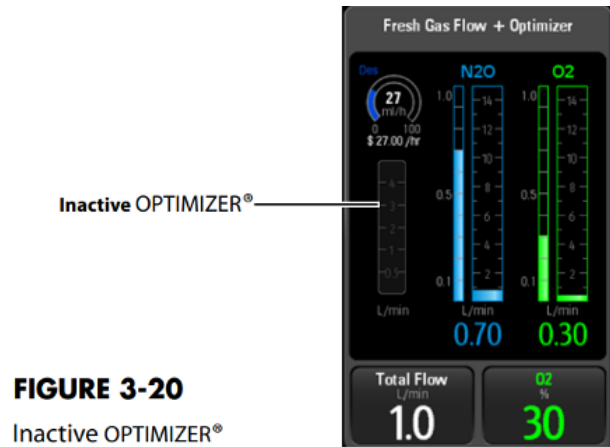
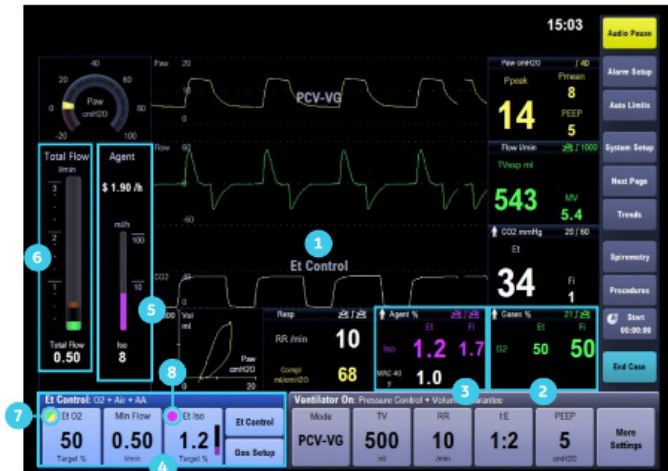


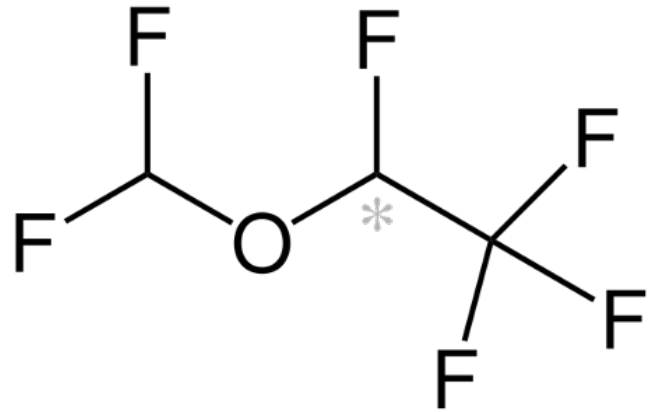
FIGURE 3-20

Inactive OPTIMIZER®

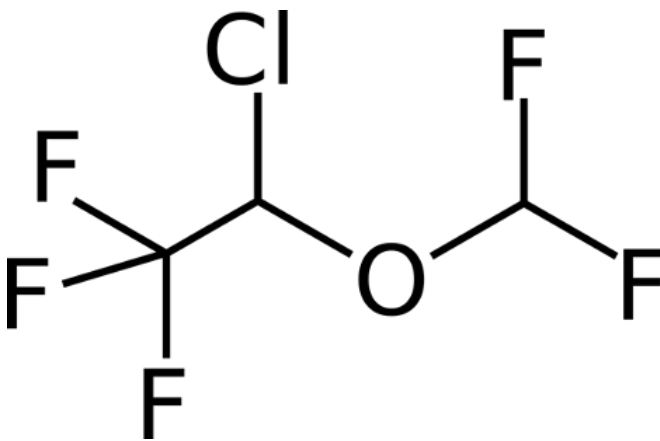
Mindray North America A7 Instruction Manual



GE HealthCare ET Control Module



Desflurane Chemical Structure – public domain



Isoflurane Chemical Structure – Public Domain



Creative Commons

## References

- Ang, T. N., Baroutian, S., Young, B. R., Hyland, M. M., Taylor, M., & Burrell, R. (2019). Adsorptive separation of volatile anaesthetics: A review of current developments. *Separation and Purification Technology*, 211, 491-503. <https://doi.org/10.1016/j.seppur.2018.10.012>
- American Geophysical Union. (2015, April 7). *Anesthetic gases raise Earth's temperature (A little) while you sleep*. Phys.org. <https://phys.org/news/2015-04-anesthetic-gases-earth-temperature.html>
- Butterworth, J. F., Mackey, D. C., Wasnick, J. D., Morgan, G. E., & Mikhail, M. S. (2022). *Morgan & Mikhail's clinical anesthesiology* (7th ed.). McGraw Hill.
- DeWitt, E. (2023, September 25). *UPMC to cease use of environmentally harmful anesthetic by end of 2023*. UPMC & Pitt Health Sciences News Blog. <https://inside.upmc.com/upmc-to-cease-use-of-environmentally-harmful-anesthetic-by-end-of-2023/>
- GE HealthCare. (n.d.). *Aisys CS2 end-tidal control software. ge monogram primary white RGB*. [https://www.gehealthcare.com/products/anesthesia-delivery/aisys-cs2/end-tidal-control?utm\\_medium=cpc&utm\\_source=google&utm\\_campaign=USC-PS-REG-AlwaysOn&utm\\_term=&utm\\_content=12518725892&npclid=Cj0KCQjAo7KqBhDhARIsAKhZ4uiwF2Kh7qEsGZa76okWt8oF2pgznZSgWDfu--88Tz0hypSHIRNrWW8aAkYYEALw\\_wcB&gad\\_source=1&gclid=Cj0KCQjAo7KqBhDhARIsAKhZ4uiwF2Kh7qEsGZa76okWt8oF2pgznZSgWDfu--88Tz0hypSHIRNrWW8aAkYYEALw\\_wcB](https://www.gehealthcare.com/products/anesthesia-delivery/aisys-cs2/end-tidal-control?utm_medium=cpc&utm_source=google&utm_campaign=USC-PS-REG-AlwaysOn&utm_term=&utm_content=12518725892&npclid=Cj0KCQjAo7KqBhDhARIsAKhZ4uiwF2Kh7qEsGZa76okWt8oF2pgznZSgWDfu--88Tz0hypSHIRNrWW8aAkYYEALw_wcB&gad_source=1&gclid=Cj0KCQjAo7KqBhDhARIsAKhZ4uiwF2Kh7qEsGZa76okWt8oF2pgznZSgWDfu--88Tz0hypSHIRNrWW8aAkYYEALw_wcB)
- GE HealthCare. (n.d.-a). *Aisys CS2 anesthesia delivery system - GE healthcare*. [https://www.gehealthcare.com/-/jssmedia/gehc/us/images/products/anesthesia-delivery/aisys-cs2/redesign/aisys\\_cs2\\_etc\\_faqs\\_global\\_jb00077xx\\_v4.pdf?rev=-1](https://www.gehealthcare.com/-/jssmedia/gehc/us/images/products/anesthesia-delivery/aisys-cs2/redesign/aisys_cs2_etc_faqs_global_jb00077xx_v4.pdf?rev=-1)
- Heron, R. (2023, January 25). *We're saying goodbye to Desflurane for good! Care Without Carbon. Working towards a greener, Net Zero Carbon NHS*. <https://carewithoutcarbon.org/whats-new/medicines-medical-gases/were-saying-goodbye-to-desflurane-for-good#:~:text=Desflurane%20is%202500%20times%20more,to%20driving%20only%20700%20miles>
- Honemann, C., & Mierke, B. (n.d.). *Low-flow, minimal-flow and metabolic-flow anaesthesia clinical ... Low-flow, minimal-flow and metabolic-flow anaesthesia Clinical techniques for use with rebreathing systems*. <https://www.draeger.com/Content/Documents/Products/Low-minimal-flow-anaesthesie-bk-9067990-en.pdf>
- Pardo, M. C. (2022). *Miller's Basics of Anesthesia* (8th ed.). Elsevier - OHCE. <https://bookshelf.health.elsevier.com/books/9780323796798>
- Yasny, J. S., & White, J. (2012). Environmental implications of anesthetic gases. *Anesthesia progress*, 59(4), 154-158. <https://doi.org/10.2344/0003-3006-59.4.154>
- Varughese, S., & Ahmed, R. (2021). Environmental and Occupational Considerations of Anesthesia: A Narrative Review and Update. *Anesthesia and analgesia*, 133(4), 826-835. <https://doi.org/10.1213/ANE.0000000000005504>
- Upadya, M., & Saneesh, P. J. (2018). Low-flow anaesthesia - underused mode towards "sustainable anaesthesia". *Indian journal of anaesthesia*, 62(3), 166-172. [https://doi.org/10.4103/ija.IJA\\_413\\_17](https://doi.org/10.4103/ija.IJA_413_17)
- Mindray North America. (2019). A Series Advantage Optimizer. [https://www.mindraynorthamerica.com/wp-content/uploads/2019/05/Optimizer-product-sheet\\_1627revA.pdf](https://www.mindraynorthamerica.com/wp-content/uploads/2019/05/Optimizer-product-sheet_1627revA.pdf)
- Mindray North America. (n.d.) Operating Instruction: A7. <https://mindraynorthamerica.com/cmsAdmin/uploads/h-046-004667-00-a7-operating-instructions-12-0.pdf>
- NHS England. (n.d.). NHS choices. <https://www.england.nhs.uk/greenernhs/whats-already-happening/nhs-organisations-cut-desflurane-in-drive-for-greener-surgery/#:~:text=At%20least%2040%20NHS%20organisations,Officer%20for%20the%20NHS%2C%20Dr>
- Electronic Flow Control System-EFCS - Mindray WATO EX-55Pro Service Manual [Page 66] (2020, August 30). ManualsLib. <https://www.manualslib.com/manual/1867426/Mindray-Wato-Ex-55pro.html?page=66>
- Özelsel, T. J. P., Sondokoppam, R. V., & Buro, K. (2019). The future is now— it's time to rethink the application of the Global Warming Potential to anesthesia. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 66, 1291-1295. <https://doi.org/10.1007/s12630-019-01385-w>
- Wong, K., Wasowicz, M., Grewal, D., et al. (2016). Efficacy of a simple scavenging system for long-term critical care sedation using volatile agent-based anesthesia. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 63, 630-632. <https://doi.org/10.1007/s12630-015-0562-1>

# Take the QUIZ

[Click here](#) for a copy  
of the quiz.

## Missing 2020 or 2021 Virtual Annual Conference Pins?

*We will confirm your attendance in our records and mail early in the new year.*

If you attended the 2020 and/or 2021 Virtual Annual Conference and are missing your pin(s), e-mail [asatt@asatt.org](mailto:asatt@asatt.org) with your name and mailing address, and which pin(s) you'd like:

2020



2021





# Notes

## REGIONAL UPDATE

### REGION 1



Happy Holidays to you all, I hope you all can spend some of your time with loved ones and family. Make cherished moments into amazing memories, whether it is something that you do together or for each other. For the little ones, it is so fun to watch them with all their new gifts

and then they grow up and cherish these memories, like making cookies for loved ones, making decorations, coloring together, learning to bake, decorating them and most of all the amazing time spent with our families and loved ones. I am trying to get ready for the white stuff that falls out of the skies in New Hampshire. Happy Holidays to you all.

A couple of items I want to mention. The first being The Practical Experience Pathway. It is an alternate way for Anesthesia Technicians to get certified. Check out the website under Cert. A.T. /Cert. A. T.T. Tab, it says specifically "The Practical Experience Pathway. "It will let you download the brochure, and it is very informative. Check it out and let me know what your thoughts are. The second item is, if you

want to become more involved, please feel free to volunteer to be on a committee, if the committee you prefer is full, we can always find another committee. It allows you to see how the BOD runs and if you want to become more involved then we will always welcome new participants.

ASATT is having its Annual Meeting on Saturday, December 16th, 2023 from 12-1 CST. Following that is the ASATT Q4 Regional Educational Webinar on December 17th from 12-4 pm, CST. ASATT has a lot of opportunities to earn CEU's by holding quarterly Webinars. Check it out and the price is very pocketbook friendly. In addition, we are always looking for articles for the Sensor. If you want more information on writing an article, please feel free to drop me a line and I can send you the information that you need to do so.

Just a reminder that if you are an ASATT Member that you will receive one free webinar per membership year. When you decide that you want to use it, please email ASATT or call 1-414-295-9220

Respectfully Submitted and Happy Holidays to you all,

**Jonnalee Geddis, Cer.A.T.**

[region1director@asatt.org](mailto:region1director@asatt.org) 

## REGION 2



Hello Region 2,

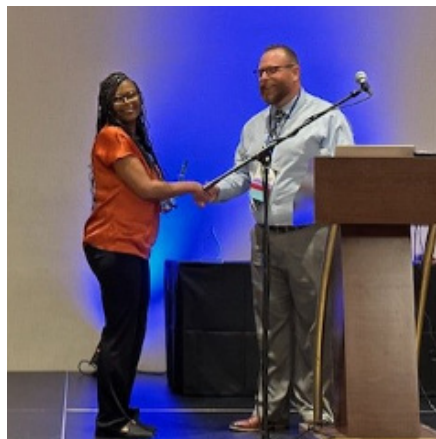
I would like to wish all of our members a Merry Christmas and Happy New Year!!

I would like to **Thank everyone** that attended our yearly conference in Pasadena! It

was great

seeing all of you! I would like to **Thank the Vendors** and the **speakers and ASATT members** that helped make this a successful conference!! As always the speakers rocked!! And to the vendors for supporting the ASATT!! I would like to give a **special shoutout to Kimberly Allen for receiving our Jami Blue Anesthesia Tech of the year award!! Thank you Dr.Phelps** for sending me pictures to be posted.

Be on the lookout for our upcoming **Quarterly Webinar Conferences!** Watch the ASATT website for the upcoming dates. Remember you can earn up to 4CE's for attending. *If you have any questions or concerns please feel free to reach out to me at [region2director@asatt.org](mailto:region2director@asatt.org).*



*Kimberly Allen receiving our Jami Blue Anesthesia Tech of the Year Award*

Don't forget if this is your year to re-certify, the certification link is now open, it is very easy following the link. Please don't wait to the last minute to get this done because we have all worked to hard for it to expire! Remember being a member has many benefits and discounts. You can get access to the sensor, ASATT updates and discounts to Educational,Regional conferences and many more valuable benefits. So make sure you check out the membership page at ASATT to see the different tiers that are offered we even have a student membership.

Don't forget to visit our ASATT website it has very useful information and updates about our zoom meetings and articles on healthcare news. And remember to check the quarterly sensor publication, remember you can earn CE's from the quizzes. It's one of many perks for being a ASATT member.

**Save the Date:** The 2024 National Conference will be held in Oklahoma City, Oklahoma at the Omni Hotel. The conference dates are September 25

-29, 2024. I hope you can join us and I look forward to seeing everyone in person.

Please everyone stay **Safe** and **Healthy!**

**Karen Patrick, Cer.A.T.**

[region2director@asatt.org](mailto:region2director@asatt.org) 

## REGION 3



Region 3 has been working on forging a relationship with the AORN in the region. We had a meeting in early November with the GA council, and it went very well. This will help bring more inclusiveness in all operating rooms. To add, we will also be

connecting with them at the national level. More to come.

If you have any questions or concerns, please contact me. I am happy to help.

Respectfully yours,

**Phillip Hood, Jr., Cer.A.T.**

[region3director@asatt.org](mailto:region3director@asatt.org) 

## REGION 4



Hi All,

I'm so excited to say that I am happy to have met a good handful of you from Region 4 and from all over at my first National Conference in sunny Pasadena! I learned so much, was able to network, and am even more impressed with this

group of allied health professionals!

Old crow, but as always I'm open to emails from any of you with questions, comments, or concerns. My hope is to offer support to those in or interested in this profession while growing recognition of our certification from health systems and other anesthesia professional organizing bodies. I also hope to connect and help compile data regarding what being an anesthesia technologist is like for you! I'd like to help make sure your voice is heard.

The weather here in north central Wisconsin is not terribly "cold and frightful" yet! Personally, I am enjoying the mild temperatures. Though, I am looking forward to a fresh blanket of snow to make the holidays even more festive! Between seasonal activities and increased surgical volumes due to

that end of year deductible being met, I hope you get time to relax and reflect on all the good that happened this year and I wish you a peaceful and joyous entry into 2024! My time on the ASATT Board of Directors has flown by and I'm excited to see what the next year brings! As a matter of fact, it's time for me to start brainstorming for topics for the webinar that I will be co-hosting this coming year. Please shoot your ideas and interests my way!

Here are the upcoming events- I hope to recognize more of your names at this webinar since we may have had the chance to meet in person in Pasadena!

- December 17th- webinar hosted by Region 7 director

I believe certification is important and one option you have is the Practical Experience Pathway. This new option went live in February. [I will link the guidelines here.](#)

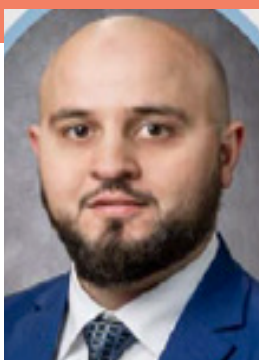
If you are hoping to gain certification but are unable to attend a program, with the appropriate work history and education requirements, this is the pathway for you.

Sincerely,

**Samantha Groshek, Cer. A.T.T.**

[region4director@asatt.org](mailto:region4director@asatt.org) 

## REGION 5



Dear Region 5 ASATT Members,

I am delighted to begin my role as your Regional Director, representing and advocating for the anesthesia technicians and technologists in the vibrant states of AR, CO, KS, LA, MS, NE, OK, and TX!

The future of our profession in our region looks incredibly promising, and it is the collaboration of each member that will define our success. I am here to champion your ideas, foster inclusion, and make Region 5 a beacon of professional excellence.

I am honored to serve in this role for the next two years and look forward to collaborating with all the dedicated professionals in our region. As we approach the New Year, I wish each of you a peaceful and rejuvenating time.

Let's connect and plan exciting events tailored to meet the needs of our region in the coming months. Your input is crucial, so let's build this future together.

Wishing you all an inspiring and fulfilling journey ahead!

Best regards,

**Ahmed Hamdan, Cer.A.T.**

[region5director@asatt.org](mailto:region5director@asatt.org) 





Howzit Everyone!!!

Mele Kalikimaka and Hau'oli  
Maka Hiki Hou!!!

Winter is here and for some of you its cold or getting cold, plus snow will soon start falling. Hawaii got its first snowfall of the year on Mauna Kea this past

week. The holiday season will be with us shortly and I hope that you are planning to spend time with your family and friends making forever memories. As I become a kupuna, I tend to want to spend more time with family and friends. Enjoy the holidays like never before...

**"We didn't realize we were making memories, we just knew we were having fun."**

*~ Winne the Pooh ~*

The NBA season is ramping up while the NFL season is heading toward an exciting play-off stretch. Congratulations to the Texas Rangers winning their first World Series in franchise history. I look forward to the MLB next season.

We had a successful 2023 ASATT Annual Educational Meeting that was held October 19th -21st, at the Pasadena Hilton in Pasadena, CA. This was the second time that the meeting was held at this venue. I thought we had a great meeting. The thing that I enjoyed most was seeing our peers/friends. I missed last year's meeting in Fort Worth, Texas, so I haven't seen my friends in a few years. President Bryan Fulton did a great job coordinating the event giving attendees more options to earn your CE's. I thoroughly enjoyed sitting with my ASATT ohana, the BOD, I got to meet, face to face the people that I see on my iPad during our BOD's meetings. It was great to meet the new members and reunite with the veteran members. It was also a pleasure meeting with the Region7 members who attended the meeting too.

**"There are friends, there is family, and then there friends that become family."**

*~ Unknown ~*

Start planning to attend the 2024 ASATT Annual Educational Meeting in Oklahoma City, OK

Don't forget to attend the ASATT Fourth Quarter Teleconference on Sunday, December 17, 2023. It's being coordinated by Region 7, the agenda is set, and look forward to a successful meeting. It's the LAST chance for you to earn ASATT sponsored CE's in 2023 if you need to re-certify by the end of the year.

ASATT is the only established society that has been recognized by other professional organizations and continues to help our profession grow and move forward into the future. I know ASATT's plan DOES NOT make everyone happy, but you must look at the overall direction that our profession is headed. Many of you have not been around as long as I have... I remember the days before we even had the National Certification. This has been a long hard journey to get to where we are now, there are no short cuts. Things haven't always been smooth sailing and we are still headed through rough seas ahead. There is no easy way to get to where we want to go. There will be some extremely hard decisions to be made and they are making these decisions with careful consideration to improve our profession. There's only a small percentage of our peers that have been in this profession >30 years like I have. As I have said before... We are laying the foundation for future generations of Anesthesia Technicians & Technologist and we MUST continue to grow and build this together.

**A team is a group of people with different abilities, talents, experience, and backgrounds who have come together for a shared purpose. Despite their individual differences, that common goal provides the thread that defines them as a team.**

**TOTAL TEAM BUILDING**  
For Engaging Events

PLEASE BE SAFE, PROTECT YOURSELVES, and TAKE CARE.


Aloha,

**Delbert Macanas, Sr., Cer.A.T.T.**  
[region7director@asatt.org](mailto:region7director@asatt.org) 

# Write an article for *The Sensor*

Interested in writing an article for the *Sensor*? It's a wonderful opportunity for you to gain national recognition and earn CEUs!

To support you, the Editorial Board will be available to answer questions and provide guidance: proofing grammar, reference documentation, etc.

[Click here](#) for details outlined on the ASATT website. 

## DID YOU KNOW?

You can now earn up to **5 CEUs** per year for contributing *SENSOR* articles!

Keep an eye out for an email with more information.







AMERICAN SOCIETY OF  
ANESTHESIA TECHNOLOGISTS  
AND TECHNICIANS

# SAVE THE DATE!

## ASATT 2024 Annual Conference & Anesthesia Tech Expo

Wednesday, September 25 - Saturday, September 28, 2024  
Omni Oklahoma City Hotel • Oklahoma City, OK



AMERICAN SOCIETY OF  
ANESTHESIA TECHNOLOGISTS  
AND TECHNICIANS

6737 W. Washington  
St. Ste 4210  
Milwaukee, WI 53214  
414.295.9220