



NIGHTWATCH™

Equine Distress & Wellness Monitor

BY BETTS COUP

There is nothing worse than losing a horse to colic or other trauma in the few hours between barn checks. It's impossible for us, as loving owners and caretakers, to be with our horses every minute of every day and night. That is exactly why Protequs (pronounced "Pro-Tech-Quis"), a biomedical engineering firm in Austin, Texas, started by Jeffrey Schab, a longtime owner and exhibitor of American Saddlebreds, is developing NIGHTWATCH™, the World's first and only equine distress & wellness monitor offered in the form of a *smart* halter or collar.

It is rare when a product comes out that cannot only change, but save lives. NIGHTWATCH™ is just one of those products. NIGHTWATCH™ is a *smart* device that comes as either a breakaway halter or safety collar and closely monitors a horse's vital signs (i.e., heart and respiratory rates) and behaviors (i.e., activity, motion, and posture). Uniquely designed and planned for comfort and safety, NIGHTWATCH™ is able to learn a horse's normal behaviors and vital signs, and quickly alert owners and caretakers at the first signs of distress. "Today, we are able to monitor real-time vital signs in horses as well as differentiate and classify certain movements, activities and postures that are indicative of distress," Jeffrey explains. It is a miraculous product—one that could certainly change our lives and save our horses.

THE ORIGINS

NIGHTWATCH™ came into being because, as so very many of us have, Jeffrey and his partner, Wade Giles, lost one of their beloved show horses in 2013. Just days after competing at the World's Championship Horse Show, Undulata's Nuts And Bolts, lovingly known as "Snoop," died from a severe case of colic, more specifically epiploic foramen entrapment (EFE), in his stall in the middle of the night. Snoop was just eight years old and had been last checked on by his caretaker at 1:30 that morning where he showed no visible signs of pain or distress. About six hours later Snoop's caretaker returned to find him down in his stall; he died 10 minutes later. Snoop's death was a devastating loss for Jeffrey and Wade, and as a result they wanted to find a way to help prevent other horse owners from experiencing this same sense of loss.

Inspired by Snoop's death, Jeffrey set out on a journey to create what would eventually become NIGHTWATCH™. As a child he had always been interested in veterinary medicine so decided to spend his undergraduate years at Tufts University with the goal to one day go onto their veterinarian program and specialize in Equine Sports Medicine. However, after graduation, as Jeffrey explains, "That desire shifted, and for the next 15 years I worked within human healthcare, but hoped to one day get back to my passion for the horses." Part of that passion, of course, included a close involvement with showing and owning horses with

Wade, including the great CH Sue-She, CH Hollywood Agent and many others. Yet after the loss of Snoop, he wanted to do more. "As a World's Champion equestrian, biomedical engineer, and someone who does not accept the status quo, I found myself on a quest shortly after Snoop's death to find a solution to the problem of equine colic, the leading natural cause of death in horses," Jeffrey explains. "Today, I am working day and night to bring NIGHTWATCH™ to the U.S. and Canadian markets in 2016." Protequs is all about horses. In fact, the name Protequs was formed from combining two words, "protection" and "equus," the Latin word for horse.

Jeffrey recognized immediately that, as he explains, "The distress and pain that Snoop experienced would have been evident by meaningful changes in his heart and respiratory rates, as well as changes in his behavior such as pawing, kicking, flank watching, rolling and more." Thus, he wanted to create something that could monitor a horse constantly for those kinds of changes in vital signs and behaviors, without anyone having to keep their eyes on the horse every minute of every day.

Over the past two years, Jeffrey has put together a multidisciplinary team of engineers, ranging from biomedical, electrical, mechanical and industrial design engineers to software and microsystem engineers—people who are, as he says, "problem solvers and experts on translating raw data into actionable insight." Of course, they needed equine expertise, too, and have therefore been working closely with many horse farms, such as Grey Ridge Farm (Versailles, Kentucky), and veterinarians, including those at Hagyard Equine Medical Institute (Lexington, Kentucky), to collect all the data they needed.

Hagyard has existed for 139 years and has more than 50 veterinarians on staff, making it the oldest and one of the largest equine veterinary practices in the world.





▲ Wade Giles and Undulata's Nuts And Bolts

"Their team of veterinarians, including Nathan M. Slovis, DVM, and Ashley E. Craig, DVM, have been true partners by offering us clinical guidance and pragmatic perspectives on how NIGHTWATCH™ not only has the potential to save the lives of many horses through earlier intervention, but also enhances the operational efficiency of equine veterinary practices," Jeffrey states. They have also sponsored research at Rochester Institute of Technology (Rochester, New York) for developing and validating novel algorithms that make NIGHTWATCH™ so unique and effective.

Of course, every horse is different, and Jeffrey and his team are very much aware of that. They created a technology in NIGHTWATCH™ that is able to gain an understanding of what's "normal" for each individual horse. "NIGHTWATCH™ is a *smart* device that utilizes adaptive-learning models to conform to your horse as they grow and mature,"

Jeffrey explains. "To maximize precision and benefit, proprietary algorithms are continuously being updated as NIGHTWATCH™ learns your horse's unique biometric parameters and behavioral patterns." You read that correctly—this device gains knowledge and learns each animal's unique and regular vital signs and behaviors over time, so it flags only those that are truly out of the ordinary. "For example, it is generally accepted that the normal resting heart rate of an adult horse is between 30 and 40 beats per minute," Jeffrey says. "However, after a horse wears NIGHTWATCH™ for a period of time, it will learn that animal's unique upper and lower limits of normal within a more narrow range, ultimately allowing the system to automatically update algorithms and other decision-making parameters to be more precise in identifying 'non-normal' events unique to that specific animal," he explains.

HOW DOES IT WORK?

All of this work to acquire and analyze data is done through a tiny computer embedded within the padded leather crown of either a breakaway halter or safety collar designed by Freedman's (Toronto, Ontario, Canada), one of the oldest and most respected names for leather craftsmanship in our sport today. When distress is detected in a horse, the device sends a wireless alert through either a Wi-Fi or cellular connection to that horse's caretaker or other assigned individual (e.g., horse owner, trainer, veterinarian). Because this distress signal is simply sent over Wi-Fi or cellular connection, like a text message might be, it's also possible for the same distress signal to be sent to multiple people simultaneously or in a cascading fashion until the person acknowledges receipt, so they're very difficult to miss. The buzzword describing this type of device and technology is known as IoT, an acronym for "Internet of Things." "IoT refers to the ecosystem of physical objects, or things, that are embedded with electronics, software, sensors and connectivity that allow these objects to exchange data and be controlled remotely within the existing internet infrastructure," Jeffrey says. Just to understand the scale of this ecosystem, it's helpful to know that it has been estimated there will be 50 billion connected devices worldwide by 2020. This is the future, and NIGHTWATCH™ is ready to give us the future now.

With NIGHTWATCH™ anyone can always track what Protequus has deemed the "EDI score," or Equine Distress Index™ score, which is accessible on a mobile device (e.g., Apple or Android smartphone) or on a computer, simply through a connection to the web. "The EDI score, which is represented on a 10-point scale, is the one number every horse owner needs to know because it's a marker of a horse's well-being at any given point in time," Jeffrey says. Just as with technology in most smartphones, NIGHTWATCH™ will use a wireless internet signal first, but if no such network is available, it will then transmit information over a cellular network, so a horse's condition is always readily available on demand.

The wonderful thing about this is NIGHTWATCH™ is mobile. It is not physically installed locally and does not rely on any certain location, thus the halter and collar transmits information wherever the horse is, whether at home, on the road or at a show...at least in the United States and Canada (for now). Moreover, a horse wearing a NIGHTWATCH™ halter or collar can always be tracked using GPS technology, which is also included in that tiny computer.

IS NIGHTWATCH™ RIGHT FOR EVERYONE?

Although NIGHTWATCH™ was originally created because of the unpredictability and fast-paced nature of colic, it can recognize signs of any equine distress. As Jeffrey explains, "Equine distress can present in many ways and stem from

many factors including injury, trauma, illness, fear and boredom. There are a number of common equine distress conditions, including colic, casting and foaling that can negatively impact your horse and result in serious injury or death if not detected and addressed early." The fact that NIGHTWATCH™ identifies changes in activity, motion and posture, as well as a horse's heart and respiratory rates, it can provide alerts about any kinds of things that cause distress in a horse.

NIGHTWATCH™ is appropriate for any horse, but could be especially beneficial for horses who are at a higher risk for distress, like those who have had prior episodes of colic or abdominal surgery, those who are pregnant or aged, horses with behavioral issues like wind-sucking, cribbing or weaving, stoic horses who don't traditionally show behavioral signs of distress, and, of course, show and performance horses who travel and experience more stress than others. The list of those for whom this product could be useful is immeasurable, simply because it could be used to save any horse's life in any kind of situation. It provides eyes and ears on a constant basis, and alerts caretakers of the need for immediate attention. "Although NIGHTWATCH™ could be worn 24 hours a day, 7 days a week, we anticipate most people will utilize NIGHTWATCH™ on horses at night or on horses in remote locations or pastures where they can't always be there," says Jeffrey. As the slogan reads, "NIGHTWATCH™ is there when you can't be."

THE FUTURE

NIGHTWATCH™ is in late-stage development and on schedule to be available in the U.S. and Canada in 2016. Once available, it can be purchased online at www.nightwatch24.com. The purchase price of NIGHTWATCH™ in its full release has not yet been confirmed, but there may be an opportunity to pre-order a limited number of these *smart* halters and *smart* collars later this year at the discounted price of about \$500. Then, the monitoring service will cost less than \$1 per day through an annual contract, arranged at the initial purchase.

Beyond this region, Protequs aims to expand the global reach of NIGHTWATCH™, enhance its features, introduce new algorithms, and explore a professional version/application for in-clinic use by veterinarians. They also plan to focus future efforts on Big Data mining and predictive analytics to potentially identify new early signs of distress and risk factors in our horses, always focusing on their protection and safety.

The future with NIGHTWATCH™ is almost unimaginable—a world in which caretakers, trainers, owners and veterinarians can constantly monitor the well-being of our beloved and valuable horses without having to actually be present with the animal. In this way, NIGHTWATCH™ provides more than just a way to be alerted in emergencies; it changes the way we track our horses' health every single day. It allows everyone involved in a horse's care to be on the same page. As Jeffrey says, "Such access to information may permit new teleconsultation solutions for better dialogue between horse owners, trainers, caretakers and veterinarians while providing more meaningful insight to make better decisions."

NIGHTWATCH™ truly is a life-changing and life-saving technology, a product that could change the



Jeffrey Schab and CH Sue-She winning the Amateur Gentlemen Three-Gaited World's Champion title at the 2011 Kentucky State Fair ▲



The NIGHTWATCH™ app can easily be used on a number of different devices ▲

way we care for our horses and make both human and equine lives the better for it. It could enable us to recognize when our horses are ill so we can take immediate proactive actions to help them. It gives peace of mind all the time, and it offers a way to be there for your horse every second of

every day. It could give us the opportunity to understand what our top athletes and beloved friends need from us on an everyday basis, and it could, in general, give us the chance to better perform our duties to protect and respect these magnificent animals.