



# HORSE & SENSE

**S**ometimes great ideas are born out of tragedy. That was certainly the case in August 2013 when Jeffrey Schab – an equestrian, engineer and entrepreneur – lost one of his horses to colic in the middle of the night.

“Although colic is the leading natural cause of death in horses, it’s usually easy to treat and benign if you intervene early, which means you need to be aware that the animal is in danger or distress,” says Jeffrey. “Immediately I thought, ‘Surely there must be some way to remotely monitor the general health status of a horse when no one is around and, more important, alert someone when there’s an issue.’”

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As a world-class equestrian, biomedical engineer and co-founder of a successful network of healthcare marketing companies, Jeffrey knew he had both the passion and the expertise to invent and commercialize a remote monitoring solution for horses. So he formed a new company, Protequus LLC – which combines the word “protection” with *equus*, the Latin word for horse – to answer this market need.

However, Jeffrey faced one major challenge. He needed someone to design and fabricate the necessary software and hardware to make his vision a reality. Fortunately, he didn’t have to look far. His brother, Michael Schab, is also an established engineer and entrepreneur – as well as owner and co-founder of a technology consulting firm, NRGXP LLC, which specializes in Internet of Things (IoT) solutions.

Although Protequus is headquartered in Austin, Texas, and NRGXP is based in Rochester, New York, the brothers’ close relationship has bridged the physical distance and resulted in a successful business partnership. “My initial vision and product idea came solely from an emotional place, and the fact that I had witnessed a market need firsthand,” notes Jeffrey. “Michael brought the expertise, bench strength and conviction needed to engineer the best possible solution.”

The resulting IoT-enabled product, NIGHTWATCH®, is the world’s first smart halter – or optional safety collar – that can save a horse’s life through early intervention in the event of danger or distress. By continuously monitoring real-time data on a horse’s heart rate and respiratory rate, as well

as its behaviors, motions and posture, NIGHTWATCH identifies abnormal patterns. The device then automatically alerts a caretaker via text, phone or email.

“NIGHTWATCH is like a home security system for your horse’s health. The system is designed to automatically alert you to a problem, any time of the day or night, so you don’t have to worry or stay up monitoring an app or video camera yourself,” says Jeffrey. “Since horses spend about half their time unsupervised, whether in a pasture or a barn, NIGHTWATCH is there when you can’t be.”

Having earned a degree in electrical and computer engineering, Michael understands the power and value of engineering simulation, especially when combined with design of experiments (DOE) methodologies. Throughout the NIGHTWATCH development program, ANSYS HFSS was utilized exclusively to understand and identify the driving factors affecting the reliable performance of the halter’s onboard ultra-wideband impulse radar (UWB-IR) antenna.





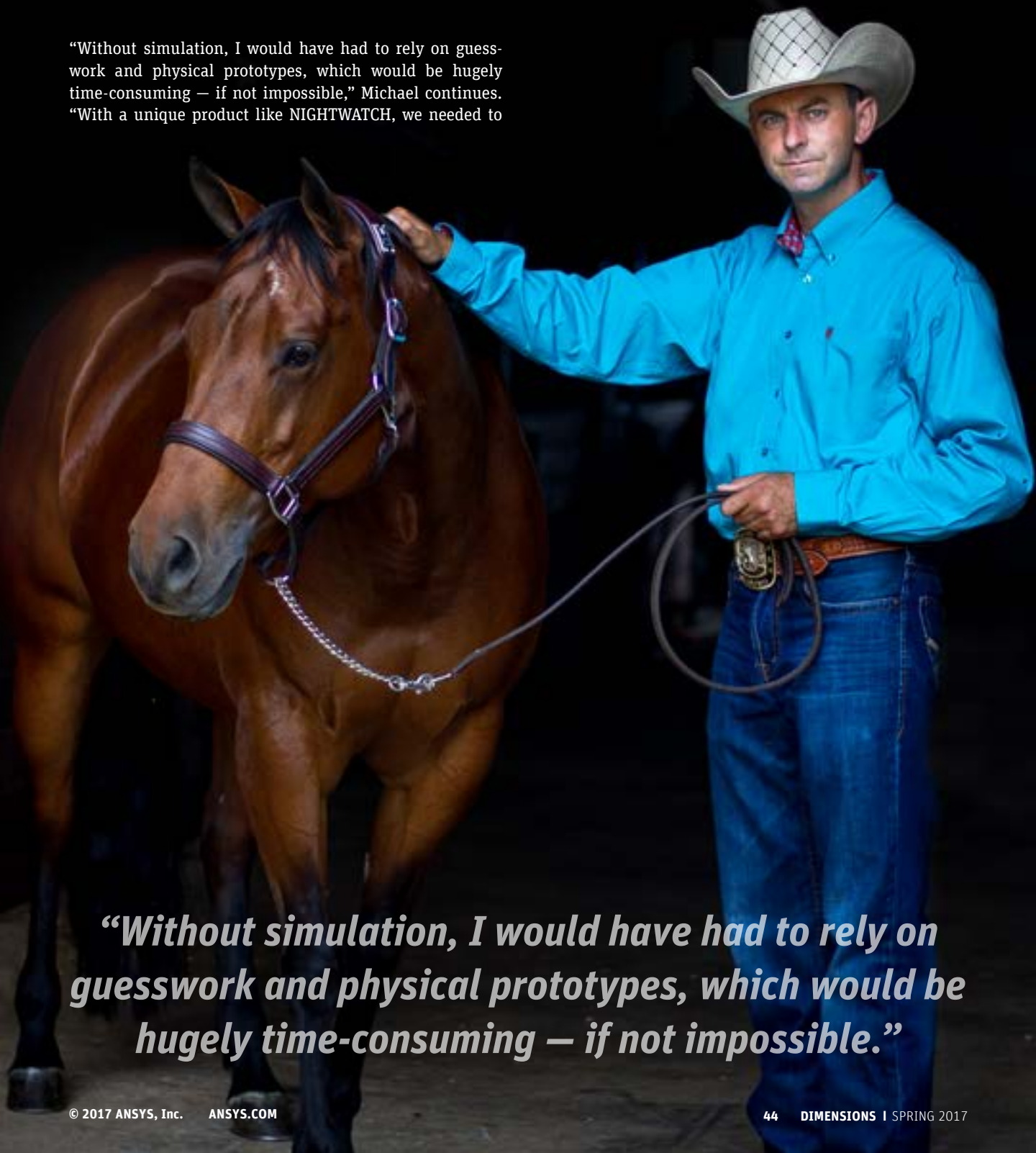
Simulation enabled the Protequs team to study a wide range of factors that could impact antenna performance, while high-performance computing allowed numerically large computations to be run in parallel extremely quickly.

“The halter has a novel antenna system that uses UWB-IR to measure biometrics, which are often the first sign of pain and distress in these animals,” Michael explains. “ANSYS HFSS has served as a kind of ‘tuning fork’ to help perfect the signaling capabilities of NIGHTWATCH and ensure that it will operate reliably in real-world conditions.”

“Without simulation, I would have had to rely on guesswork and physical prototypes, which would be hugely time-consuming — if not impossible,” Michael continues. “With a unique product like NIGHTWATCH, we needed to

have complete confidence in signal integrity, while moving quickly to make this lifesaving device available to as many horses as possible.”

“Each day, more than 100 horses in the United States alone will die of colic, and that’s what keeps us up at night,” states Jeffrey. “We’re literally on the cusp of not only saving horses’ lives, but also revolutionizing how insurance companies assess risk, how veterinarians practice telemedicine, and how researchers use real-world data to study and prevent colic and other forms of equine distress.”



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