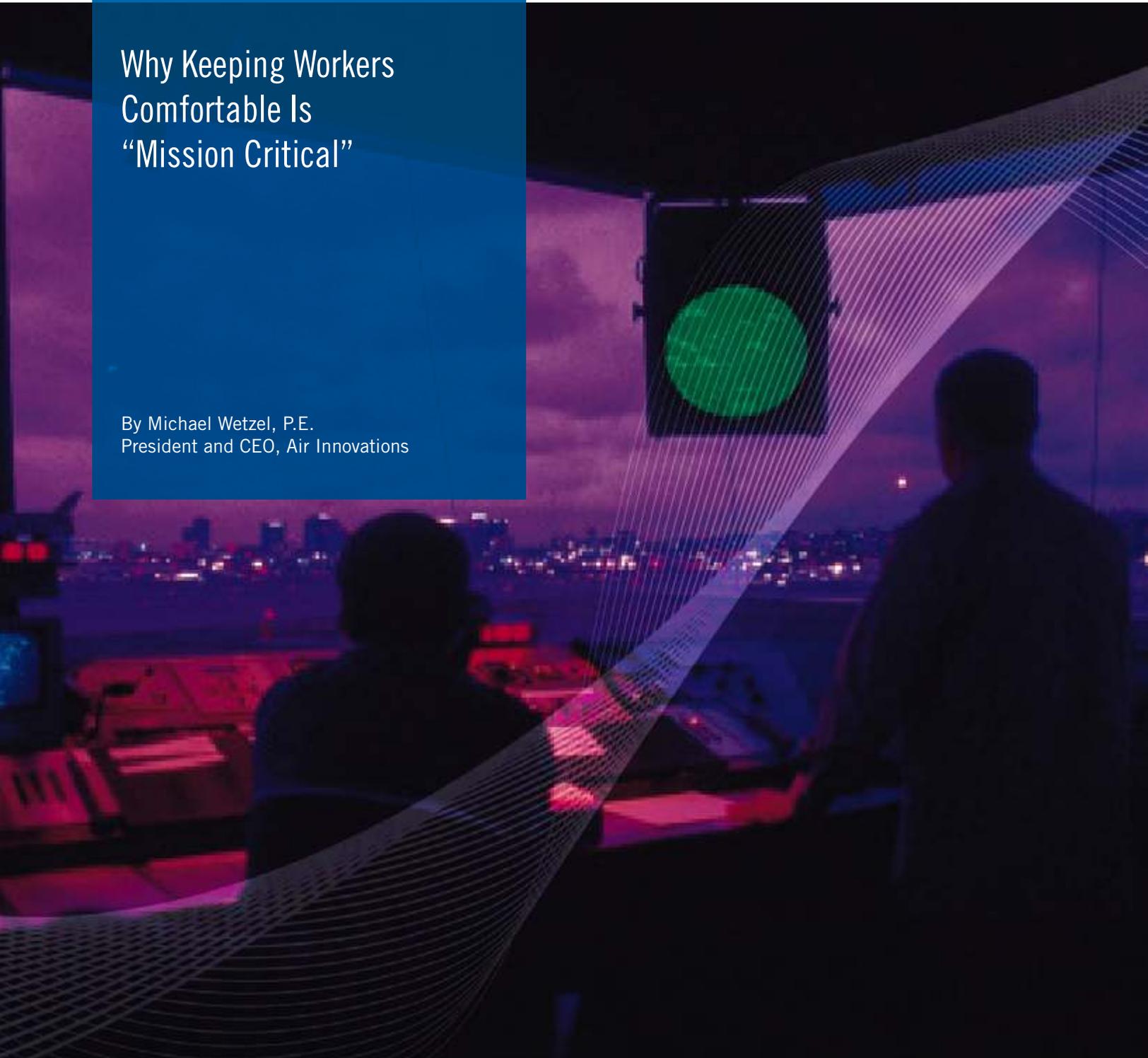


THE HUMAN FACTOR

Why Keeping Workers Comfortable Is
“Mission Critical”

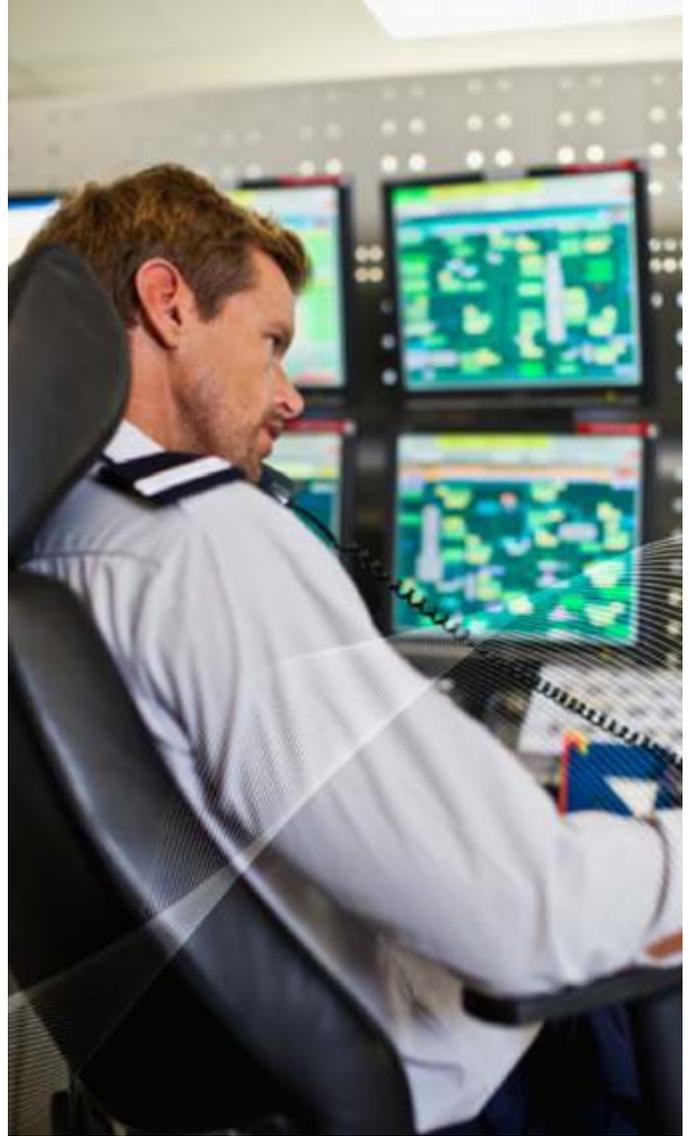
By Michael Wetzel, P.E.
President and CEO, Air Innovations



You're circling a busy airport in the rain when the captain announces it's going to be another half hour before you land. As groans ripple through the cabin, you put on a favorite song, pop open your book and make the best of it, knowing that somewhere down through the clouds a phalanx of air traffic controllers is guiding each aircraft and thousands of passengers safely to their destinations.

Naturally, anyone who flies has a vested interest in making sure those controllers stay physically comfortable on the job. That means no distracting neck cricks or back strains from hunching over an ill-positioned desk console; no sweats from heat radiating off all of that computer equipment or chills from room air conditioners set too low.

Yet because humans come in a wide variety of shapes and sizes, with a similarly wide range of temperature preferences, maintaining the right conditions for each controller can be a challenge. Welcome to the world of "micro environments," where environmental specialists such as Air Innovations are finding innovative solutions to keeping such workers feeling their best in high-stress jobs.



CONSTANT ALERT

Though their job is in many ways unique, traffic controllers fall under a broad category of "mission critical" workers—those who spend virtually all of their time at workstations handling tasks that demand their continual and complete attention. Think of 911 dispatchers, prison guards assigned to monitor movements on multiple screens, or aerospace experts who track the course of a mission.

While most workers can get up and move around freely, mission critical workers can't divert their attention or move far from the work space. And, since in most cases the work stations must be manned 24 hours a day, workers rotate in and out, making it that much more difficult for individuals to customize it to their liking.

THE HUMAN FACTOR

At Air Innovations, we spend most of our time creating clean environments for machines at tolerances well beyond the realm of human senses. Our aerospace systems, for example, protect delicate payloads from trace amounts of airborne salt and other contaminants as a rocket makes its way to launch. For the semiconductor industry, we control temperature in delicate stages of the manufacturing process to 3 one-hundredths of a degree.

So, it's a welcome challenge to create comfortable spaces for these vital workers. Humans, of course, can tolerate a much wider range of conditions. Still, when we began designing micro systems in 2014, our engineers attacked the problem with similar goals as with our other precision projects: How can we pack sufficient power and control into a system that is compact, adaptable to different settings, easy to use and also cost-effective?

Working with manufacturers of emergency consoles and other desk consoles, we developed systems enabling individual workers to stay warm, through forced air heating, or to feel cooler with variable speed fans, as well as adjustable louvers enabling them to direct air flow.

EASE OF USE

Knobs and buttons arrayed around the console might just add to workers' stress, so we consolidated all of the controls onto a simple, color touch screen panel that also allows workers to set their own lighting level, and lift or lower the height of the console.

And, since workers may be sitting at different consoles during different shifts, some of our units come with the ability to store up to 99 distinct user profiles, enabling a shift worker to [customize the environment](#) to his or her liking with a single press.

Just as we don't actually ride those rockets into outer space, those of us who build environmental control units don't experience the pressures of guiding dozens of planes over a crowded city. But knowing that we have something to do with keeping those workers calm and comfortable is a tremendous satisfaction.



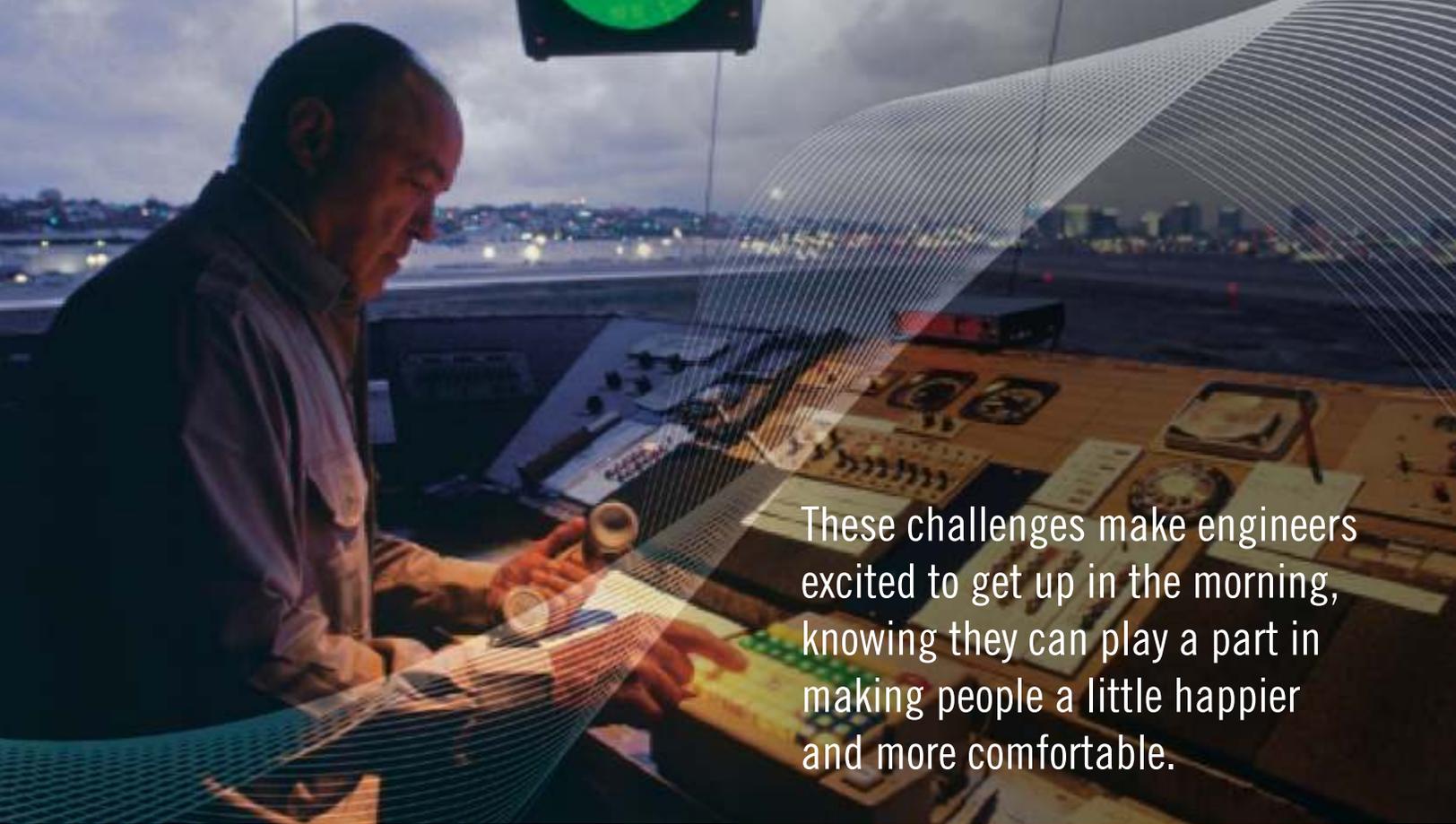
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THE NEXT GREAT LEAP

As effective as such systems are, micro environment cooling currently involves a fan blowing room temperature air. While that certainly creates a cooling sensation on the skin, the next great challenge is to create systems that can actually generate cold air in an efficient way—potentially revolutionizing comfort levels for millions of people who work in more conventional office settings.

Conventional air conditioning isn't practical on a desk-by-desk basis, due to the cumbersome ductwork needed to expel hot air. Still, the payoffs of customizable environments could be enormous, potentially saving companies millions of dollars while at the same time helping the environment by decreasing national energy consumption.

Under a grant from the U.S. Department of Energy, Air innovations has partnered with Syracuse and Cornell Universities, as well as Carrier Corp. and Bush Technical, to take micro environments to the next level.



These challenges make engineers excited to get up in the morning, knowing they can play a part in making people a little happier and more comfortable.

PHASE CHANGERS

The system operates using a benign, waxy “phase change” material that functions much like a block of ice stored near each worker’s desk. Because this material has a much higher melting point than ice, it remains solid through most of the workday, gradually melting and releasing cool air that workers can direct to whatever degree suits their comfort.

Most important, the system, unlike regular air conditioning, produces no excess heat during the cooling process. At night, when the office space is unoccupied and energy costs are lower, a compressor refreezes the material so it’s ready to go the next day.

When available on a mass scale, perhaps within the next couple of years, the system (which also contains a heater) will enable each worker to customize temperature at his or her desk or cubicle. And companies no longer have to try to keep everybody comfortable through a central HVAC system. Setting the overall office temperature as high as 79 degrees in the summer and as low as 66 degrees in the winter could greatly reduce energy bills.

COOLING ON THE GO

Even as we work to perfect the office micro environment, Air Innovations is working on a separate Energy Department grant project, with the University of Maryland: A portable system that would bring the same temperature control benefits to people outside the office. That might range from a construction worker laboring in the heat to members of the congregation in a crowded church, to a sports fan at a baseball game.

While using a twist on the same technology, the portable system is still in early phases of development. The principle challenge is one of scale—getting the system to a size that’s easy to carry. Yet if history tells us anything, such challenges represent temporary obstacles rather than dead ends. They’re the sort of challenges that make engineers excited to get up in the morning, knowing they can play a part in making people a little happier and more comfortable whether they’re directing airplanes through a fog, working an office job, or sunning themselves in the bleachers on a Saturday afternoon.



At Air Innovations, all of our equipment is custom designed for particular applications. Unlike other companies who build commercial-off-the-shelf type equipment, we create a solution that's tailored to your unique challenges. If you have an idea you would like to find an environmental control solution for, a challenging environmental control issue that's yet to be addressed, or a project coming up that requires specialty environmental control, we would like to talk to you before you write your specification or release an RFQ – we are climate control experts, after all.

So whether it's an environmental control application for aerospace, the military, a research lab, the pharmaceutical industry or a medical device—or an out-of-the-box concept you'd like to explore—simply fill out our contact form at airinnovations.com/contact-us or give us a call. We're looking forward to talking to you!

For more information about our aerospace projects or to learn more visit us at:

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Or call:

800-825-3268 or 315-452-7400



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