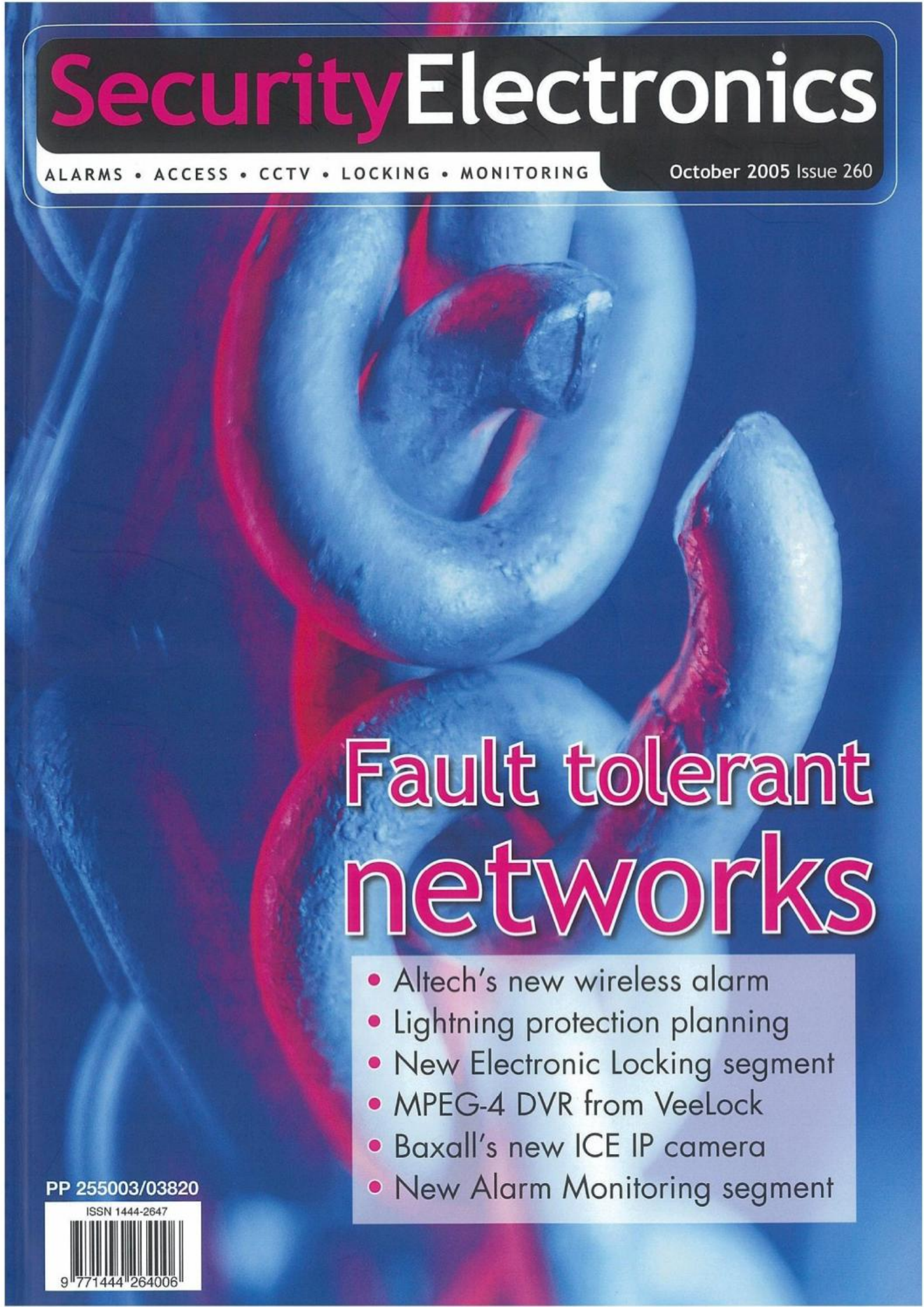
Security Electronics

ALARMS • ACCESS • CCTV • LOCKING • MONITORING

October 2005 Issue 260



Fault tolerant networks

- Altech's new wireless alarm
- Lightning protection planning
- New Electronic Locking segment
- MPEG-4 DVR from VeeLock
- Baxall's new ICE IP camera
- New Alarm Monitoring segment

PP 255003/03820

ISSN 1444-2647

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Lightning

It's among the most powerful forces on the planet, generating heat greater than the surface of the sun and inducing electrical currents capable of blasting security systems to bits. With lightning, protection is always better than cure.

By Simon Hensworth*

INFORMATION systems, electronic devices and electronic security are relied on more and more in modern facilities. These systems can handle numerous roles that once required human-power. It's a trend that has been the source of massive savings for facilities everywhere. However, the risk inherent with a heavy reliance on electronic systems can be gauged by the consequences to a business if all of the electronic systems are suddenly neutralized and unable to be recovered. This frightening scenario has happened to numerous ill-prepared facilities that have been struck by severe lightning.

Understanding lightning

The most common theory for the occurrence of lightning is that electrons are knocked from particles in the air by a constant collision of moisture – either rain or hail. Once a significant charge separation occurs, a build-up of surplus electrons lower in the atmosphere will jump to earth by the easiest path. This is generally via the tallest object in the vicinity, commonly manmade structures.

In the process of discharging to earth, lightning can produce flashes that reach into the millions of volts. This can be absorbed by cabling, pipes and electronic systems and cause overloads that can temporarily disable or permanently destroy information systems, electronics and systems. While flashes may only last for milliseconds, they can produce temperatures of up to tens of thousands of degrees C, which can burn holes through metal sheeting, melt wiring and circuitry and cause fires or even fatalities.

Lightning has the potential to cause major disruptions to business through a loss of electronic systems including information networks and communication systems. Also at risk are electronic security systems and their failure may compromise your facility's security solution.

Lightning protection

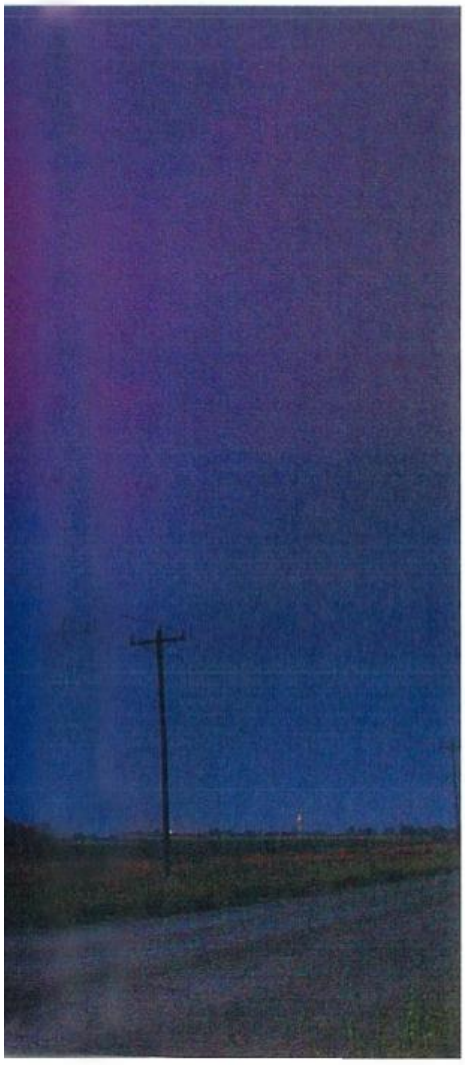
Lightning protection is an issue that can often be overlooked or underemphasized. Protection may not be considered at the design stage of the building making getting its application more difficult. Meanwhile older facilities may not have been built taking any protection of electronic systems into account. Lightning protection is also often overlooked when facilities undergo renovations or extensions that may compromise

Image by Macsound

protection

existing lighting protection systems or completely change lightning protection requirements.

Lightning protection is also often overlooked because of the rarity of severe lightning strikes. A building or structure may enjoy decades without incident, but then be struck with a surge that could threaten continuation of its operations. The potential risk from lightning should be determined by the potentially low likelihood but also the potentially extreme consequences of sudden loss of all electrical systems.



Who is at risk?

There are a number of factors that can create problems or increase risk to a facility. The relative height of the building to its surroundings is a major issue. A single-story building located between, or in close proximity to other taller buildings will generally be protected by the taller buildings, if one considers the "Rolling Sphere" theory. However, if the same single-story building was located in the middle of a flat open area its relative height to its surroundings makes it a far more likely target.

Similarly, multi-story buildings that stand higher than their immediate surroundings are more likely targets of lightning. While most multi-story buildings are equipped with lighting protection, ever-changing usage of floor space and alterations to building infrastructure may make existing lightning protection insufficient for increasingly technology-reliant operations.

Another deciding factor is the resistivity of the earth that surrounds the building. If the building is located on earth that can absorb the electrical charge of a lightning flash, less damage may be likely to occur to the building and its contents. If the building is located on earth that resists the electrical charge of the lightning, the building and its contents may be more susceptible to surges and subsequent damage.

Planning protection

The risk of lightning can be significantly reduced by an integrated lightning protection system. Earth resistivity testing can determine the ability of the earth around a facility to absorb the electrical energy of a lightning flash. Some earth types are good at conducting electrical charges, which allows lightning to be quickly directed to earth, away from a building and its contents. Other earth types resist electrical charges to the extent that the lightning's energy will take other paths in order to reach earth. These other paths may include cabling, piping and other conductors throughout a building that could be connected to vital electronic systems.

Other measures to improve the chances of directing lightning around, rather than through a building include: air terminations, down conductors and earthing. These systems channel the energy from a lightning flash around the building and into earth. Residual voltage surges, and surges introduced into a building through pipes and cabling can also be reduced by surge protection devices.

No one strategy can completely protect a facility from the potential damage of lightning. A layered, integrated approach is the best means of lowering the risk. ■

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