Ensuring FCC Compliance: The Value of a Well-run NOC

The value of improved air safety aside, the biggest single financial effect of a well-run national operations center (NOC) in the telecommunications industry is the ability to receive a waiver from having to do quarterly lighting inspections (QLI waiver).

By Brian Beck, Robert M. Smith and Mitch Bateman

With more than 275 million wireless phone subscribers in the United States who demand more services and features each day, wireless carriers grow their networks to keep customers satisfied. More than 245,000 telecommunications towers are devoted to the task of keeping wireless service available 24 hours a day. There were only 96,000 telecommunications towers a mere 10 years ago.

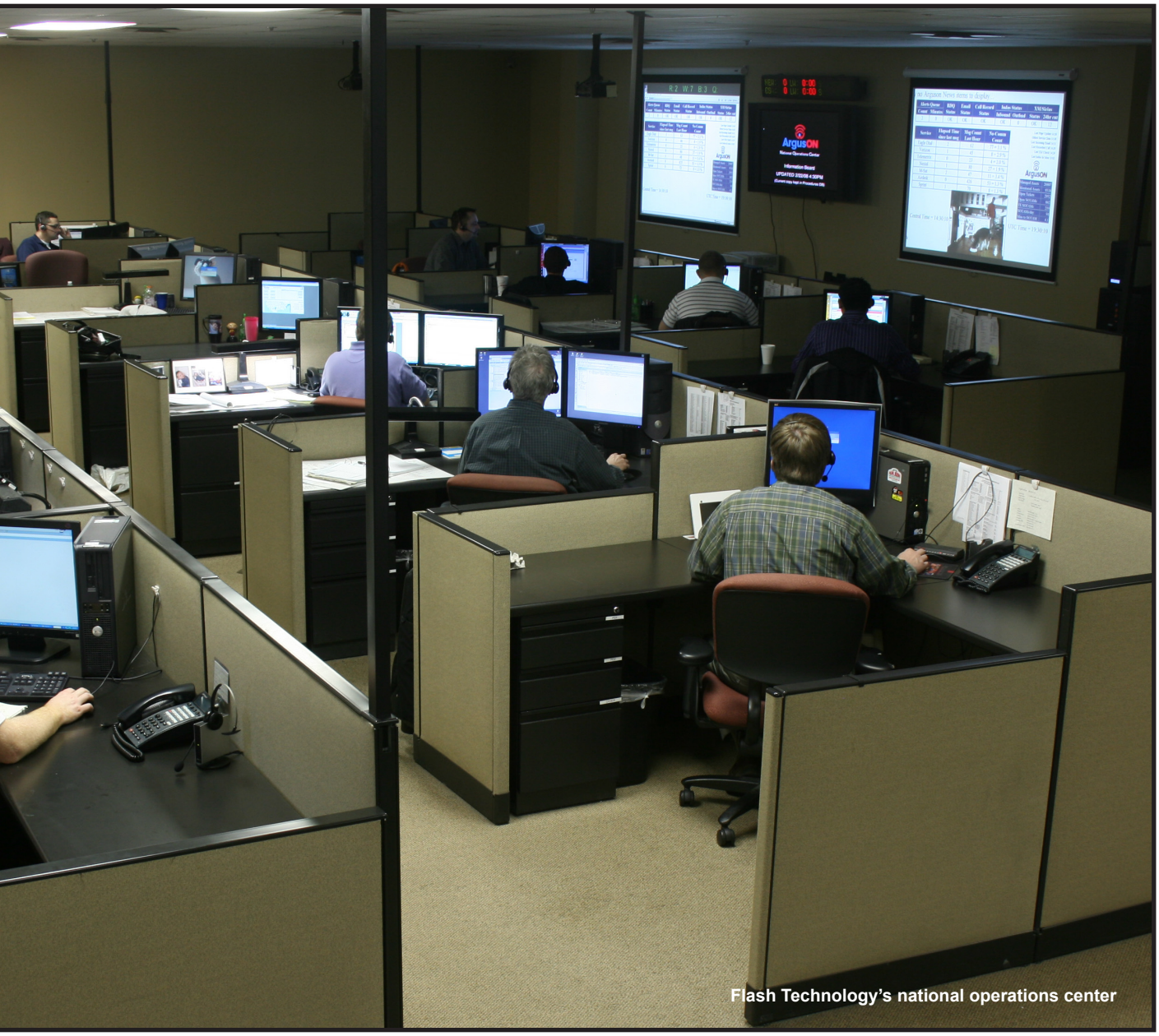
The Communications Act of 1934 gave the Federal Communications Commission authority to require the painting or illumination of antenna towers when it determines that such towers may constitute a hazard to air navigation. 47 U.S.C. § 303(q).

Over the years, the FCC reorganized rules applicable to radio station licensees and modified the rules to allow visual observations, the observation of an automatic indicator or the use of an automatic alarm system designed to detect antenna lighting system failures. Licensees were required to make observations of lights at least once every 24 hours either visually or by automatic indicator, and inspect such automatic indicators and alarm systems at least once every three months to confirm that automatic control devices and alarm systems were functioning properly.

Initially, tower watchers were employed to check the operation of obstruction lighting. As the number of towers grew, the use of tower watchers became impractical. The complexity and challenge of complying with the FCC requirements becomes increasingly apparent when the tower owner or operator has multiple sites.

A tower watcher might serve as a temporary solution, but it makes sense that the telecommunications tower, wind power generation and electric utility industries use new technology for monitoring to run a compliant, cost-effective operation.

In the 1960s, new technology emerged to take the place of the tower watchers. One predominant early monitoring system used a fuse-based meter design. This fuse-based meter design permitted only one-way contact between the monitoring system and the tower-lighting equipment, which usually was checked once every 24 hours. This system also suffered from the fact that it was possible for a bulb to be extinguished without the fuse being tripped, and thus without a NOTAM-worthy alarm being gen-



Flash Technology's national operations center

erated. (NOTAM stands for Notice to Airmen, a notice sent by the FAA to alert pilots to unmarked aviation hazards.)

Subsequent advances in technology offered dry-contact systems. Although this approach offered improvement over the fused-based approach, it still contained deficiencies that might prevent a tower owner from realizing that a light was no longer working.

The latest monitoring technology uses advanced machine-to-machine (M2M) solutions that report real-time alarms and 24-hour status updates to a national or network operations center (NOC). This technology allows tower owners and NOCs to see more than an on/off indicator. This solution gives system data and diagnostic information about the lighting systems, and such information helps tower owners focus on their core business without the worries of lighting compliance. Reporting alarms within minutes of an outage is impossible with tower watchers and without an around-the-clock operations center. In the telecommunications industry, the NOC's core goals are to ensure air safety and lighting compliance and to save their customers money. A NOC's attendants are specifically trained on rules and regulations to ensure compliance.

Acting on data

It is easy to get lost in all the rules, guidelines and regulations, so let's define the FAA/FCC documents involved in marking and lighting obstructions.

The *Code of Federal Regulations* (CFR) is the administrative law, general and permanent rules and regulations published in the Federal Register by the executive departments and agencies of the federal government of the United States. Related matters are grouped together. For example, Title 47 Tele-

communications Part 17 deals with the construction, marking and lighting of antenna structures and Title 14 Aeronautics and Space Part 77 deals with objects affecting navigable airspace.

The *Advisory Circular* (AC) system became effective in 1962. It provides a single, uniform, agency-wide system that the FAA uses to deliver advisory material to FAA customers, industry, the aviation community and the public. The AC system provides guidance such as methods, procedures and practices acceptable to the administrator for complying with regulations and grant requirements. The ACs that affect marking and lighting obstructions are:

- **AC 70/7460-1K:** FAA standards for marking and lighting structures for aviation safety
- **AC 150/5345-43F:** Specification for obstruction lighting equipment
- **AC 150/5345-53C:** Airport Lighting Certification Program
- **AC 150/5345-53C Appendix 3 Addendum:** Certified equipment and manufacturers list

What to report and when

The FCC's Code of Federal Regulations (CFR) Title 47 Part 17.48 covers what to report and when. It can be summarized as follows: The extinguishment or improper functioning of any top steady burning light or any flashing light, regardless of its position, not corrected within 30 minutes shall be reported immediately to the FAA for a Notice to Airmen (NOTAM) to be issued. This means that if any top or mid-tier flashing lights are out, missing flashes, the wrong intensity or give incorrect flashes per minute, the issue must be reported to the FAA.

The FCC is the enforcer of the CFR. If a violation is found, the FCC will issue a Notice of Violation (NOV). An NOV doesn't mean the tower owner is guilty; it means the FCC has serious concerns about the stated issue. The affected tower owner is responsible for explaining the violation in a timely manner. Subsequently, the FCC may issue a Notice of Apparent Liability (NAL) or a Forfeiture Order, which are fines that could be thousands of dollars. The FCC also has the capability to shut down sites, cancel operating licenses and prosecute if regulations aren't followed.

As of Aug. 1, 1991, those fines start at $8,000 for private radio, $20,000 for broadcasters and $80,000 for common carriers. Depending on the severity and history of occurrences (even for a recent licensee), these amounts can rise dramatically.

In the United States, during the past 10 years, about 150,000 additional telecommunications towers have been built, as have about 23,000 wind turbines. As the telecommunications and wind power generation industries grow to meet the public need, following FCC regulations is even more imperative to maintain air safety. When incidents occur, the average settlement cost can be millions of dollars. A company's risk can be greatly reduced by using a well-run NOC (see table of FCC regulations).

Managing the repairs, monitoring, reporting, documentation and compliance for multiple sites can become overwhelming. When it does, using a NOC makes sense. Not only does the NOC help to maintain air safety, it also can save customers time and money. By using innovative M2M technology, a NOC watches over vital processes to ensure the performance is optimized. An effective NOC monitors, collects, analyzes and delivers critical information to key personnel, enabling them to make sound, data-driven decisions that improve profitability.

Let's take as an example the hypothetical Reliable Tower Company, which owns 8,000 towers. If Reliable attempts to comply with the FCC statute using only its internal resources, then in a given year, Reliable is likely

FCC regulations and how an effective NOC keeps you compliant

CFR Title 47	NOC Feature?	How a NOC helps to maintain compliance
17.21 Paint and lighting, when required	YES √	NOC can verify FCC data against actual lighting installed and notify customer of any discrepancies.
17.47 Inspection of antenna structure lights and control equipment	YES √	NOC will automatically check status at least every 24 hours and create reminders about inspection due dates.
17.48 Notification of extinguishment or improper functioning of lights	YES √	NOC will report all light outages/malfunctions to FAA within minutes of a NOTAM-worthy event.
17.49 Recording of antenna structure light inspections in the owner record	YES √	NOC keeps record of all events, alarms, repairs and inspections.
17.51 Time when lights should be exhibited	YES √	NOC monitors that the correct lights are on and functioning at the correct time, 24/7/365.

to have to receive, process and act upon about 105,000 telephone calls from contractors and others; receive, process and manage about 375,000 electronic messages; and issue 80,000 service tickets. Imagine the investment required of Reliable in terms of people, equipment, space and training to accomplish that, to say nothing of acquiring the knowledge needed to do so.

For a portfolio of 8,000 towers, who keeps track of the nature, type and age of equipment at each site? Who knows when the standby generator was last serviced? Who keeps track of the service crew's activity logs?

If Reliable chooses instead to outsource these tasks to a well run NOC, the company can focus more attention and resources on meeting the growing customer need for more cellular services, thereby generating more revenue

A NOC is a solution from systems integration, equipment specification, design and communications to a Web-based platform and data analytics. Crucial data can be simultaneously routed to the NOC and the tower owner's team. Armed with this information, tower owners can reduce truck rolls, determine the type and age of equipment on a site, diagnose failures and be more prepared with the correct parts. Most NOCs provide an online customer portal, which provides live status of assets, tickets and history available anywhere and at any time to improve processes and services.

As the telecommunications and wind power generation industries grow to meet the public need, following FCC regulations is even more imperative to maintain air safety.

The biggest single financial effect of a well-run NOC in the telecommunications industry is the ability to receive a waiver from having to do quarterly lighting inspections (QLI waiver).

In 2007, the FCC began granting the lighting inspection waiver for companies that used advanced data diagnostic monitoring systems with an experienced NOC. The FCC granted the waiver based on the fact that the robust monitoring capabilities, real-time alarm systems and trained NOC personnel are so reliable that they render quarterly inspections unnecessary. The issuance of the waiver was done in hopes that other tower owners would be encouraged to invest in state-of-the-art technologies so that they, too, would become capable of continuous, real-time monitoring of their lighting systems and control devices.

In 2009, the FCC granted an expedited waiver process that allowed tower owners using the Eagle platform offered by Flash Technology to submit minimal paperwork to be granted the waiver.

When a QLI waiver has been granted, the cost savings to the customer can be quite significant. Consider the hypothetical Reliable Tower Company. Without a waiver, its portfolio of 8,000 towers requires four on-site lighting inspections annually, for a total of 32,000 visits. Let's assume the cost of a truck roll to a site visit is $500. Reliable spends $16 million annually to inspect the lights on its portfolio of towers. However, with a waiver from the FCC to perform only one lighting inspection per year, Reliable's inspection costs would drop by 75 percent (one visit per site instead of four). In this example, Reliable could save as much as $12 million a year.

Using a well-run NOC makes good business sense for several reasons, including overall improvement to air safety; reductions in the investments needed for infrastructure, people and training; substantial reduction in the risk exposure to FCC fines for noncompliance; and significantly reduced operational costs. agl

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