CASE STUDY

Brazil Achieves World's First Elections Using BGAN

Brazil has a history of innovation in voting. It was the first country in the world to implement fully electronic elections. In 2008, it became the first nation to use BGAN mobile satellite technology for voting. BGAN enabled fast, secure, reliable and cost-effective transmission of results from 1,125 remote precincts throughout Brazil—the world's largest BGAN deployment to date.

BGAN terminals like this one transmitted results gathered by electronic voting machines (left).

Need for Superior Remote Communications

In Brazil's 1989 presidential elections, counting paper ballots took nine days. To speed up the process, Brazil's Tribunal Superior Eleitoral (TSE)—the Superior Electoral Court—tested electronic voting machines in the 1990s. By 2000, Brazil was the first country to hold completely automated elections, dramatically shortening the vote counting process.

By going electronic, however, the TSE faced the challenge of establishing reliable communications with hundreds of small villages in rural areas lacking access to terrestrial networks. Not only did TSE technicians at remote sites need voice capability to stay in touch with headquarters, they required secure, efficient transmission of electronic ballot data to the TSE server in Brasilia, the federal capitol.

In previous elections, data were transmitted from laptops via satellite phone. Unfortunately, according to television news reports, "the signal frequently got lost and transmission was slow." In fact, 9.6 kbps was the maximum data speed. Although transmitting electronic ballots, counting votes, and returning results to Regional Electoral Courts no longer spanned *days*, the process still took at least twelve hours. Final counts were not available until the day *after* polls closed—a frustrating situation for voters and candidates. Part of the problem was low bandwidth; another was signal quality fluctuations caused by the incumbent provider's aging satellite constellation.

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In 2008, therefore, the TSE issued a new tender looking for efficient, secure and cost-effective satellite communications for 1,125 remote polling stations to be set up for municipal elections in October.

The World's Largest BGAN Deployment

After three intense rounds of bidding against two competitors in Brazil, Tesacom—a StratosELITE partner based in Argentina, the leading mobile satellite solution provider in South America—won the contract. Tesacom joined forces with Stratos and terminal manufacturer Addvalue to provide a totally new solution using Inmarsat's BGAN (Broadband Global Area Network) technology and services.

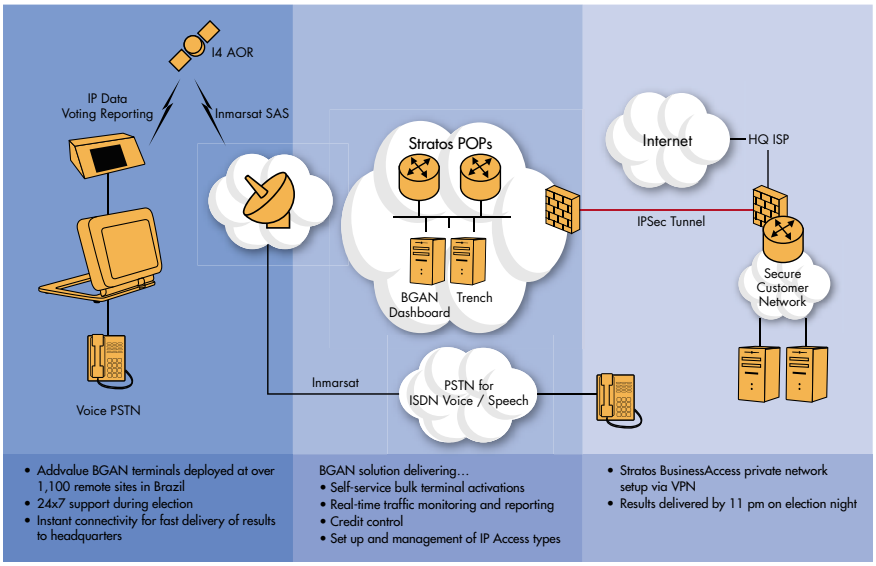
"The Superior Electoral Court chose Tesacom for several reasons," explained Silvina Graziadio, Tesacom's MSS Business Unit Manager. "One service provider's price was just too high. The other was suffering worldwide service degradation, which raised obvious concerns. Tesacom, on the other hand, ran loads of tests to demonstrate BGAN's speed, reliability and ease of use—at a price the TSE was willing to pay."

Unlike previous communication solutions, BGAN offered flexible service options, including simultaneous voice and data connectivity at speeds up to 492 kbps (about *50 times faster* than the previous service). Addvalue's Wideye SABRE 1 terminal was compact, robust, simple to use, and inexpensive. The Stratos Advantage—bulk activations, data encryption, dedicated VPN, terminal authorization, cost controls, and real-time traffic monitoring—proved critical to success. Customized 24/7 support was provided through close coordination between Tesacom, Stratos, Inmarsat and Addvalue.

"During BGAN testing at a rural village we transferred data from ten polling stations to the Court. It took just five minutes—a speedy success."

— Rivaldo Pereira Borges, Director of Technology, Regional Electoral Court-Mato Grosso do Sul

With only four weeks between the purchase order and elections, timing was critical. It took just two weeks to obtain 1200 BGAN terminals from Addvalue in Singapore. Using bulk activation options in Stratos Dashboard, Tesacom activated all SIM cards in three days. To help TSE manage costs, only required service options were opened for each SIM card and credit control was established.



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Tesacom offered train-the-trainer programs to 300 TSE employees and produced a seven-minute training DVD for all first-time users. "Setting up the BGAN is very quick and easy," said Graziadio. "Like connecting USB to your computer."

With massive logistical aid from the Brazilian Army, which was responsible for election security, TSE transported BGAN equipment and electronic ballot boxes to rural precincts via helicopter, truck and boat.

Impressive Speed, Security and Reliability

BGAN enabled extremely rapid transmission of voting results to the TSE in Brasilia. During initial testing at a remote village, Rivaldo Pereira Borges, Director of Technology for the Regional Electoral Court in Mato Grosso do Sul, told a television reporter: "We even transferred data from ten polling stations to the Court. It took just five minutes—a speedy success."

Communications were so fast, Val Oliveira, a TSE technician added, "It's as if you're in the room next to the Superior Electoral Court, where all the votes are counted." The TSE used BGAN for both voice calls and FTP data transfers. They set up a private network linking all 1,125 precincts via an IPSec VPN through Stratos BusinessAccess, a secure network totally isolated from the Internet and unauthorized access.

Stratos Trench enabled Tesacom to create and select individual firewall rule sets, and save them as default settings for bulk activations. Technicians in the field did not require special settings, usernames or passwords. This simplified process proved critical to success for so many first-time BGAN users. Stratos Dashboard and Stratos Trench also allowed Tesacom and the TSE to monitor call data records for each terminal in real-time, ensuring continuous information flow—a distinct advantage over the previous solution.

While the actual transmission of election data required just minutes with BGAN, counting the votes and delivering final results to regional organizations still took about four hours. Nevertheless, this was *one-third the elapsed time* of former elections. Results were reported by 11 p.m. the same day—to everyone's delight.

The BGAN system suffered no congestion or network issues despite unusually heavy usage. At times, nearly 500 BGAN terminals within a geographic area achieved simultaneous transmission on a single spot beam. "It was amazing," Graziadio concluded. "That many terminals successfully transmitting data at once demonstrated the absolute reliability of the BGAN equipment, network, and satellite constellation. Thanks to Stratos value-added services, all of this was achieved quickly, securely and safely for very limited costs."

"With BGAN transmission of electronic ballot data from a remote precinct it's as if you're in the room next to the Superior Electoral Court, where all the votes are counted."
— Val Oliveira, Technician, Superior Electoral Court

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BGAN from Stratos. Remotely connected. Everywhere. Every time.

www.thepowerofbgan.com

BGAN Key Benefits

BGAN users can access e-mail, corporate networks, the Internet, transfer files, make telephone calls, and transmit streaming IP data via satellite. Key benefits and features include:

- A range of small light-weight, highly portable and rapidly deployable terminals
- Ability to communicate from anywhere, even when terrestrial networks are not operational
- High-speed wireless IP data and circuit-switched network
- Shared capacity IP data rates up to 492 kbps
- Streaming IP data rates up to 256 kbps
- Simultaneous voice and data – on different channels
- Optional guaranteed bandwidth
- Support for legacy applications and a platform for new IP-based solutions
- Support for supplementary services, e.g., call hold, call waiting, call forwarding, SMS card and voicemail

The Stratos Advantage

- Stratos Dashboard™
  - Self-service bulk activations
  - Real-time traffic monitoring and reporting
  - Credit control
  - Set up and management of IP Access types
- Stratos Trench™ (Customer Managed Firewall)
  - Firewall rules
  - Real-time Data traffic information and troubleshooting
- Stratos BusinessAccess
  - Private and secure network solution
  - Extend LAN networks to BGAN

About Tesacom

Tesacom, South America's leading provider of remote communications, supplies integrated solutions and services to government, maritime, oil and gas, agriculture, first responder, mining, transportation and military markets. Tesacom's new BGAN Rental Service is available to South American businesses, media and government agencies. Visit www.tesacom.net.

About Addvalue

Addvalue Communications Pte Ltd, a subsidiary of Addvalue Technologies Ltd of Singapore, is a leading provider of satellite communications, tracking and telemetry solutions, and digital wireless design services and a global supplier of BGAN land-mobile satellite terminals. Visit www.addvaluetech.com.

About Stratos

Stratos is the world's trusted leader for vital communications. With more than a century of service, Stratos offers the most powerful and extensive portfolio of remote communications solutions including mobile and fixed satellite and microwave services. More than 20,000 customers use Stratos products and industry-leading value-added services to optimize communications performance. Stratos serves U.S. and international government, military, first responder, NGO, oil and gas, industrial, maritime, aeronautical, enterprise, and media users on seven continents and across the world's oceans. For more information visit www.stratosglobal.com.

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