

## NEWS

## UKRAINE'S INTERNET

## The besieged country's complex internet infrastructure has evolved to promote resiliency

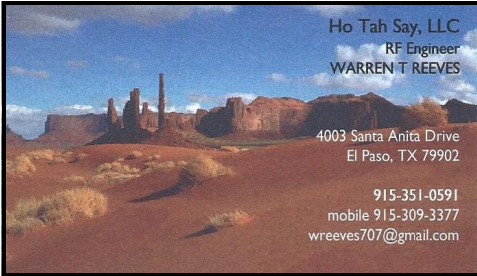
**AS RUSSIAN TANKS** rolled into Ukraine on the morning of February 24, the internet shuddered—and for some, stopped completely. Major Ukrainian internet service provider Triolan had been temporarily knocked out, in a blackout that mostly affected the northeastern Kharkiv region—a target of the Russian invasion. Even as the network came back online the following day, smaller disruptions plagued it throughout the week, according to data from the Internet Outage Detection and Analysis (IODA), an internet connectivity observatory affiliated with Georgia Tech. The Russian-occupied regions of Donetsk and Luhansk also experienced drops in connectivity.

Since the beginning of the conflict, there have been concerns that Russia-backed hackers might attempt to disconnect Ukraine's internet, in the same way they took down the country's power grid in 2015. Since February 23, Russia's cyber army has been carrying out repeated distributed denial of service (DDoS) attacks against government websites, overwhelming them with spurious traffic in order to take them offline. (Ukraine's own cyber warriors have been retaliating in kind.) But despite what happened to Triolan, Russia's chances of carrying out a full-fledged internet shutdown against Ukraine are low.

Internet shutdowns, as a rule, are enacted by governments with the ability to order internet service providers (ISPs) to disconnect, throttle, or restrict access to the internet. Staging a shutdown as an external attacker is much harder to pull off. Russia could try aiming its DDoS or other cyberattacks at the border routers that connect an ISP's network to the global internet, says Doug Madory, director of internet analysis at internet measurement company Kentik, but an attack that could take down a website might have a harder time knocking out internet infrastructure. "It wouldn't be really practical to take the whole country offline with a DDoS attack," Madory says. "Those routers are pretty robust. And probably, if it was easy, they would have done it by now."

It is not impossible in the abstract: After all, earlier this year an American hacker orchestrated a DDoS attack to take down North Korea's servers. But Ukraine has been battle-hardened by its past brushes with Russia's cyberattacks, and its preparedness and sophistication are much higher than North Korea's. More important, however, is the fact that any attacker would be presented with a vast number of targets rather than a single vulnerable bullseye. Ukraine's size and geographic position mean that it is deeply interconnected with Europe's internet backbone.

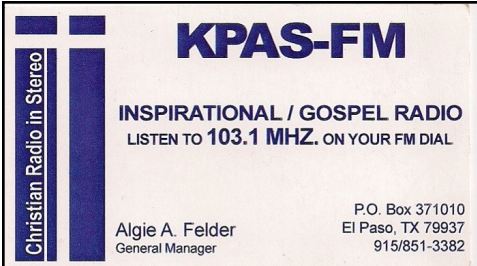
KTSM-TV  
KVIA-TV  
KRWG-TV  
KBNA-AM/FM & KAMA-AM  
KHEY-AM/FM, KPRR-FM & KTSM-AM/FM  
KLAQ-FM, KISS-FM & KROD-AM  
KPAS-FM-  
ALGIE A. FELDER CSBE  
KINT98.COM  
INTERNET RADIO NETWORK  
BURST COMMUNICATIONS  
INC.- KIRK BASEFSKY  
JOHN LACKNESS  
ENTRAVISION  
COMMUNICATIONS  
SCMS, INC.-  
ABS ADVANCED BROADCAST  
SERVICES, LLC  
KSCE-TV  
RF Specialties of Texas  
KCOS-TV  
KELP-AM  
ARNOLD McClatchy.  
MARSAND, INC.  
Ho Tah Say. LLC



Ho Tah Say, LLC  
RF Engineer  
WARREN T REEVES

4003 Santa Anita Drive  
El Paso, TX 79902

915-351-0591  
mobile 915-309-3377  
wreeves707@gmail.com

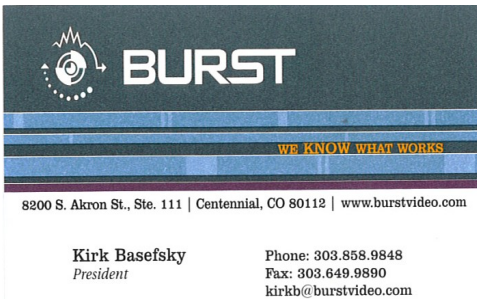


**KPAS-FM**

INSPIRATIONAL / GOSPEL RADIO  
LISTEN TO **103.1 MHZ.** ON YOUR FM DIAL

Algie A. Felder  
General Manager

P.O. Box 371010  
El Paso, TX 79937  
915/851-3382



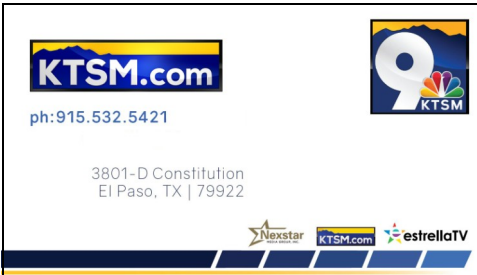
**BURST**

WE KNOW WHAT WORKS

8800 S. Akron St., Ste. 111 | Centennial, CO 80112 | www.burstvideo.com

Kirk Basefsky  
President

Phone: 303.858.9848  
Fax: 303.649.9890  
kirkb@burstvideo.com



**KTSM.com**

ph: 915.532.5421

3801-D Constitution  
El Paso, TX | 79922

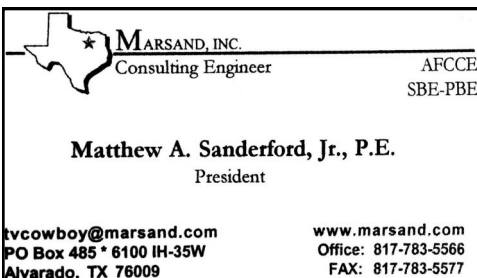
Nextstar KTSM.com estrellatv



KEVIN LOVELL  
General Manager

KVIA-TV 7  
4140 Rio Bravo  
El Paso, Texas 79902  
Tel. (915) 496-7777  
Fax. (915) 532-0070

Website  
kvia.com  
e-mail  
kvia@kvia.com



**MARSAND, INC.**  
Consulting Engineer

AFCCE  
SBE-PBE

Matthew A. Sanderford, Jr., P.E.  
President

tvcowboy@marsand.com  
PO Box 485 • 6100 IH-35W  
Alvarado, TX 76009

www.marsand.com  
Office: 817-783-5566  
FAX: 817-783-5577

A spokesperson for the Ukrainian Internet Association says the country boasted over 4,900 ISPs as of December 2021; some of them have been making preparations ahead of the crisis, establishing fail-safe links with each other and setting up new backup network centers, according to The New York Times.

Ukraine's internet has developed in a decentralized fashion due to market dynamics, but that has served it well in the past few years, says Tanya Lokot, a professor in digital media and society at Dublin City University. "There was a realization that it's a natural, healthy way to organize the network. When you have a variety of traffic exchange points, you have a variety of internet service providers across the country, a variety of mobile phone operators; it just leads to a more reliable system overall," Lokot says. She contrasts that model with Russia's own internet, which is dominated by a few state-controlled operators and which the government is working to separate from the global internet through a kill switch. "They [Russia] are trying to centralize control, and in terms of resilience of the system, that is damaging because it's much easier to target," Lokot says.

Ukraine's resilience, however, extends beyond the sheer number of providers. If cyberattacks do not work to take down an ISP, a Russian military determined to disconnect Ukraine might decide to just strike the connectivity infrastructure by bombing server rooms or cutting off fiber optics cables.

go to Page 5

## SBE CHAPTER 38 OFFICERS

### CHAIRMAN

Antonio Castro  
SBE member # 11456.  
KFOX/COX retired Chief Eng.  
800 Arredondo dr.  
El Paso, TX 79912  
915-584-1220 home  
915-525-8507 cell  
farahjac@sbcglobal.net

### VICE CHAIRMAN

Bruno Cruz  
SBE member # 25867  
200 E. Alto Mesa  
El Paso, TX. 79912  
915-757-7898  
915-526-1842 cell  
Bruno.cruzJR@kfoxtv.com

### TREASURER

Walter Hanthorn  
SBE member # 18307  
KSCE TV  
4461 Gen. Maloney  
El Paso, TX. 79924  
915-269-7583 home  
915-532-8588 office

### CERTIFICATION COMMITTEE:

David Halperin.

### MEMBERSHIP COMMITTEE:

Antonio Castro  
Warren Reeves

### FREQUENCY COORDINATION COMMITTEE:

Warren Reeves  
Owen Smith

### SCHOLARSHIP COMMITTEE:

Rick Vilardell

### WEB SITE COMMITTEE:

Norbert Miles

### SUSTAINING MEMBERSHIP:

Antonio Castro

### PROGRAM CHAIRMAN:

Warren Reeves

### NEWSLETTER:

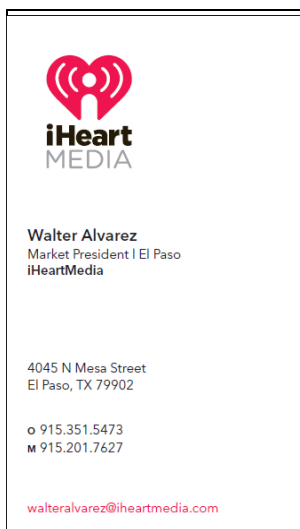
Antonio Castro

### EAS CHAIRMAN:

David Halperin

### EXECUTIVE COMMITTEE:

Antonio Castro  
Bruno Cruz  
Walter Hanthorn



## EL PASO, TX SBE CHAPTER 38 MEETING MINUTE

DATE 2/15/2022

LOCATION: ZOOM (Antonio's)

**MEETING CALLED TO ORDER:** 11:00 AM, BY ANTONIO CASTRO.  
THERE WERE 16 (SIXTEEN) ATTENDANTS

**REPORT OF THE SECRETARY:** MINUTES IN THE FEBRUARY NEWS-LETTER. ACCEPTED BY DAVID GRICE, SECONDED BY MARIO JIMENEZ

**REPORT OF THE TREASURER:** \$ 5120.80 IN THE BANK , ACCEPTED BY DAVID GRICE, SECONDED BY WARREN REEVES.

**REPORT OF THE CERTIFICATION COMMITTEE:** NO REPORT

**REPORT OF THE MEMBERSHIP COMMITTEE:** WARREN REEVES VOLUNTARIED TO HELP IN TALKING TO SUSTAINING MEMBERS.

**REPORT OF THE FREQUENCY COORDINATOR COMMITTEE:** NO REPORT.

**REPORT OF THE SCHOLARSHIP COMMITTEE:** REMINDER TO INVITE APPLICANTS FOR THE \$1K SCHOLARSHIP. APPLICATION IS POSTED IN OUR WEBSITE TIL THE END OF MARCH.

**REPORT OF THE WEBSITE COMMITTEE:** NOW 3550 VS. 3471 EQUAL 79 HITS. LOOKING GOOD.

**REPORT OF THE EAS CHAIRMAN:** TEXAS AND NEW MEXICO-MONTHLY TESTS WERE FINE.

**REPORT OF THE PROGRAM COMMITTEE:** MEMBERS OF FUEL-GRAFF GAVE US THEIR PRESENTATION IN OBSTRUCTION LED LIGHTS..

**NEW BUSINESS OR ANY ITEMS FOR THE CHAPTER INTEREST:** NONE

**OTHER** NONE

**NEXT MEETING DATE AND LOCATION:** MARCH 8, ZOOM FROM ANTONIO AT 11 AM

**MEETING ADJOURNED :** 11:17 AM, THEN THE PRESENTATION TIL 11:48 AM

BY THIS TIME, ALL THE INVOICES WERE MAILED. YOU MAY PAY DIRECTLY TO SQUARE OR YOU CAN CALL ME WITH YOUR CREDIT CARD ON HAND, OR JUST DROP A CHECK IN THE MAIL....BUT DO IT ! IT IS ONLY THE COST OF A LUNCH !!!!



# MARCH PROGRAM

FOR LAST MONTH OF FEBRUARY,  
WE HAD THE PRESENTATION OF  
**FUELLGRAF CHIMNEY AND TOWER,**  
THEY SPECIALIZE IN LED AVIATION  
OBSTRUCTION LIGHTING FOR  
BRADCAST TOWERS

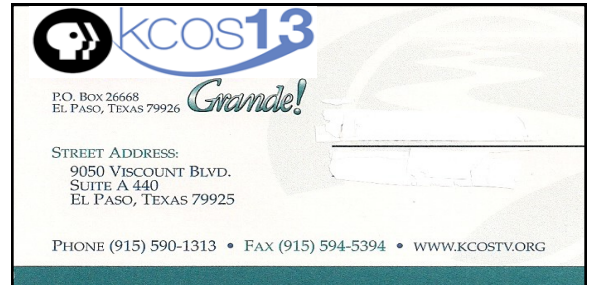
NOW, FOR THIS MARCH MONTH WE  
ARE NOT GOING TO HAVE ANY  
PRESENTATION. ONLY OUR REGULAR  
CHAPTER MEETING, FACE TO FACE.

WHEN: MARCH 8, 2022

WHERE: ZOOM FROM ANTONIO'S

TIME: WINDOW OPENS AT 10:30 AM  
FOR WELCOMING AND INFORMAL  
CHAT, 11 AM WE DO OUR CHAPTER  
MEETING.

PLEASE TRY TO ATTEND BECAUSE  
WE HAVE IMPORTANT ISSUES TO  
DISCUSS. THANK YOU



. As a matter of fact, a possible—if unconfirmed—explanation for Thursday’s outage is that Russian bombs damaged Triolan’s infrastructure in Kharkiv. But it is unclear if a more methodical targeting of network equipment would result in a total internet blackout. In Ukraine’s crowded ISP market, all providers have adapted to be fleet-footed and address even the smallest technical snag swiftly and effectively, according to Vadym Hudyma, a researcher at digital rights advocacy group Digital Security Lab Ukraine.

“Partially because of this fierce competition—sometimes accidentally, sometimes not really accidentally—providers can cut their competitors’ network. They would just ‘accidentally’ cut the cables, for example, while trying to cut their own,” he says. “So in order to survive in these chaotic scenarios, where sometimes a few meters of your cable can be cut out in the middle of the night, each provider has to be really, really flexible and be able to redirect network flows on the fly.” That does not necessarily mean that the country’s current internet infrastructure would be able to withstand a concerted Russian effort to destroy it. That consideration might have led the Ukrainian government to request—and obtain—support from SpaceX CEO Elon Musk to activate his Starlink satellite internet service in the country. But one wonders whether Russia even wants to fully take down the internet in a country it has been pelting with disinformation. “The Ukrainian government has zero interest in shutting down the internet, obviously,” says Hudyma. “But the same can be said for the Russians: They are trying to push their propaganda and influence operations on the Ukrainian populations. It is useful for them to have this communication network online.”