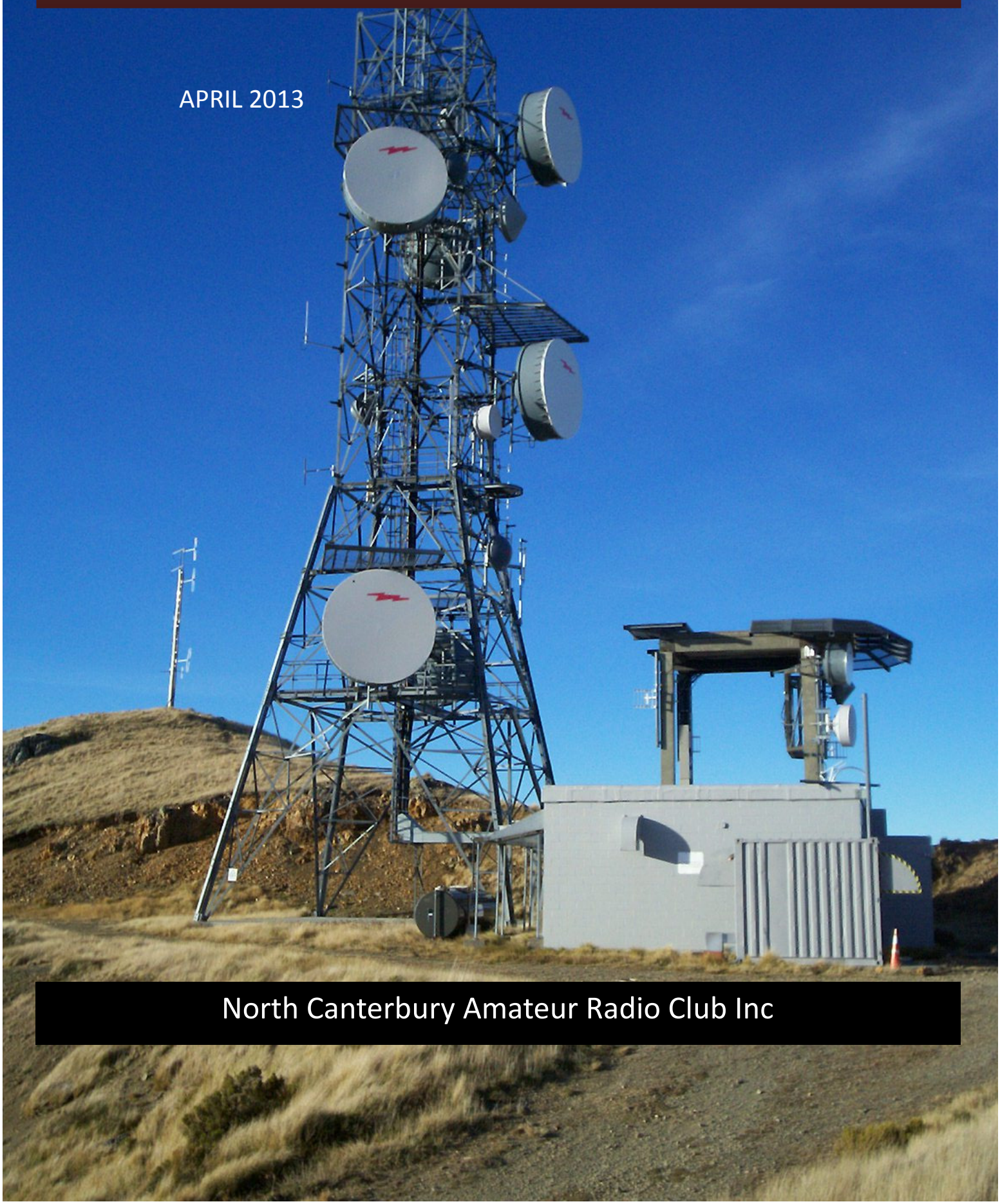
Ragchew

APRIL 2013



North Canterbury Amateur Radio Club Inc

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CLUB COMMITTEE			
President	Don MacDonald	ZL3DMC	03 327 7415
Vice President	Owen Pimm	ZL3GM	03 310 6070
Secretary	Colin Rowe	ZL3COL	03 313 2303
Treasurer	Denise Hider	ZL3HI	03 313 4907
AREC S/Ldr.	Don MacDonald	ZL3DMC/ZK9EG	03 327 7415
Ragchew Editor	Don MacDonald	ZL3DMC	03 327 7415
Committee	Bev Gillman	ZL3OV	03 313 7137
	Geoff Gillman	ZL3QR	03 313 7137
	Rob Carpenter	ZL3RO	03 312 8621
	Tony Buckland	ZL3HAM	03 312 5352
	Ann Fraser	ZL3TNT	03 313 3646
	Mike Kennedy	ZL3AKZ	03 313 3646
SPECIAL INTEREST CONTACTS			
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Digital	David Fraser	ZL3AI	03 314 6825
RPT Trustees 6975	Mike Kennedy	ZL3AKZ	03 313 3646
	Brian Holland	ZL4WX	03 351 2521
675	Geoff Gillman	ZL3QR	03 313 7137
	Richard Smart	ZL4FZ	03 385 8355
ZL3RR	Geoff Gillman	ZL3QR	03 313 7137

Cover: Mount Grey Repeater, 146.750mhz

Presidents Report

Hello again, doesn't the month roll around quickly! A highlight of the month for me was participating in the CQ WPX competition as part of the ZL3X team. You will remember that Geoff ZL3GA gave us a talk on the contest site up on the Port Hills, near Mount Pleasant. I did 4, 4hour shifts with one being a double 2100hrs Sun night till 0500 Mon morning, the bed never looked so good! Over 2500 QSO's 99 countries and a score of 6,500,000….a good result.

Next meeting Tony ZL3HAM will be showing a DVD of a recent dxpedition. I'm looking forward to it.

73

Don ZL3DMC

Annual Subscriptions

$40 Single, $50 Family

No Repeater Levy from transmitting members for this year.

Payment by instalments can be arranged with the Treasurer.

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North Canterbury

AMATEUR RADIO EMERGENCY COMMS.

Forest / Rural Firecomms: (AREC supplied Comms/Logistics for Forestry Fire Units.)

Sat. 16/3/13. Waimak River, near Eyrewell Forest. Two Forestry units attended an early morning assistance call to fire from 2 trashed/burned out cars getting into an Ecan Plantation.

Geoff ZL3QR

Dep. S/L.

Civil Defence: Geoff and I attended a meeting of all the stakeholders for Waimakariri Civil Defence. Brenan Wiremu, the Emergency Management Advisor, outlined their trining program for 2013. Our involvement will depend on the requirement for radio operators as some of the planned excersises were desk top only.

Don MacDonald

ZK9EG Section Leader

Canterbury Nets and Frequencies

Branch 68 HF 3.665MHz, 0730hrs UTC 1st Thursday of the month

Canterbury 2M SSB net on 144.200 Tuesdays from 8-10pm [Vertical Pol.]

6M Net on 3850 6M Repeater Thursdays from 8-10pm [Vertical Pol.]

Branch 68 VHF net 6975 Repeater, ~ 2000+ hrs on Sundays, after the Canterbury Area Net

Canterbury Area Net 5625 Repeater, 2000 hrs on Sundays

National Broadcast, last Sunday of the month at 2000hrs on 3.900MHz, National System, 6975 and 705 Repeaters

April Happy Birthday's

Dennis ZL3WDB

Creating Indestructible Self-Healing Circuits

Caltech engineers build electronic chips that repair themselves

PASADENA, Calif.—Imagine that the chips in your smart phone or computer could repair and defend themselves on the fly, recovering in microseconds from problems ranging from less-than-ideal battery power to total transistor failure. It might sound like the stuff of science fiction, but a team of engineers at the California Institute of Technology (Caltech), for the first time ever, has developed just such self-healing integrated chips.

The team, made up of members of the High-Speed Integrated Circuits laboratory in Caltech's Division of Engineering and Applied Science, has demonstrated this self-healing capability in tiny power amplifiers. The amplifiers are so small, in fact, that 76 of the chips—including everything they need to self-heal—could fit on a single penny. In perhaps the most dramatic of their experiments, the team destroyed various parts of their chips by zapping them multiple times with a high-power laser, and then observed as the chips automatically developed a work-around in less than a second.

"It was incredible the first time the system kicked in and healed itself. It felt like we were witnessing the next step in the evolution of integrated circuits," says Ali Hajimiri, the Thomas G. Myers Professor of Electrical Engineering at Caltech. "We had literally just blasted half the amplifier and vaporized many of its components, such as transistors, and it was able to recover to nearly its ideal performance."

The team's results appear in the March issue of *IEEE Transactions on Microwave Theory and Techniques*.

Until now, even a single fault has often rendered an integrated-circuit chip completely useless. The Caltech engineers wanted to give integrated-circuit chips a healing ability akin to that of our own immune system—something capable of detecting and quickly responding to any number of possible assaults in order to keep the larger system working optimally. The power amplifier they devised employs a multitude of robust, on-chip sensors that monitor temperature, current, voltage, and power. The information from those sensors feeds into a custom-made application-specific integrated-circuit (ASIC) unit on the same chip, a central processor that acts as the "brain" of the system. The brain analyzes the amplifier's overall performance and determines if it needs to adjust any of the system's actuators—the changeable parts of the chip.

Interestingly, the chip's brain does not operate based on algorithms that know how to respond to every possible scenario. Instead, it draws conclusions based on the aggregate response of the sensors. "You tell the chip the results you want and *let it* figure out how to produce those results," says Steven Bowers, a graduate student in Hajimiri's lab and lead author of the new paper. "The challenge is that there are more than 100,000 transistors on each chip. We don't know all of the different things that might go wrong, and we don't need to. We have designed the system in a general enough way that it finds the optimum state for all of the actuators in any situation without external intervention."

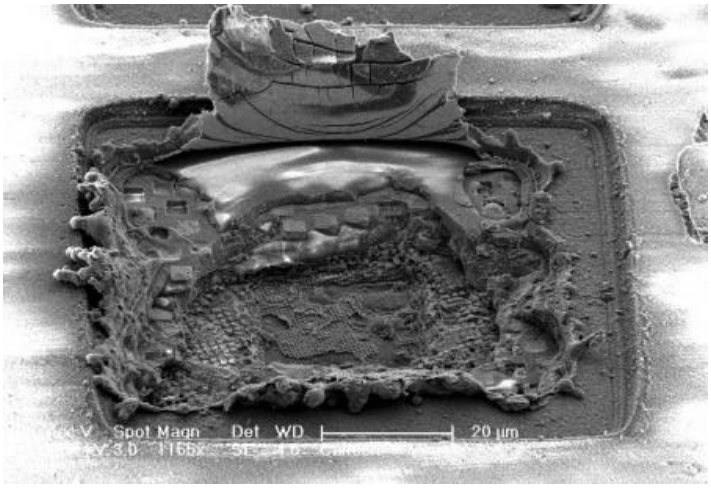
Looking at 20 different chips, the team found that the amplifiers with the self-healing capability consumed about half as much power as those without, and their overall performance was much more predictable and reproducible. "We have shown that self-healing addresses four very different classes of problems," says Kaushik Dasgupta, another graduate student also working on the project. The classes of problems include static variation that is a product of variation across components; long-term aging problems that arise gradually as repeated use changes the internal properties of the system; and short-term variations that are induced by environmental conditions such as changes in load, temperature, and differences in the supply voltage; and, finally, accidental or deliberate catastrophic destruction of parts of the circuits.

The Caltech team chose to demonstrate this self-healing capability first in a power amplifier for millimeter-wave frequencies. Such high-frequency integrated chips are at the cutting edge of research and are useful for next-generation communications, imaging, sensing, and radar applications. By showing that the self-healing capability works well in such an advanced system, the researchers hope to show that the self-healing approach can be extended to virtually any other electronic system.

"Bringing this type of electronic immune system to integrated-circuit chips opens up a world of possibilities," says Hajimiri. "It is truly a shift in the way we view circuits and their ability to operate independently. They can now both diagnose and fix their own problems without any human intervention, moving one step closer to indestructible circuits."

Along with Hajimiri, Bowers, and Dasgupta, former Caltech postdoctoral scholar Kaushik Sengupta (PhD '12), who is now an assistant professor at Princeton University, is also a coauthor on the paper, "Integrated Self-Healing for mm-Wave Power Amplifiers." A preliminary report of this work won the best paper award at the 2012 IEEE Radio Frequency Integrated Circuits Symposium. The work was funded by the Defense Advanced Research Projects Agency and the Air Force Research Laboratory.

Written by Kimm Fesenmaier……...Cont next page



Some of the damage Caltech engineers intentionally inflicted on their self-healing power amplifier using a high-power laser. The chip was able to recover from complete transistor destruction. This image was captured with a scanning electron microscope.

Credit: Jeff Chang and Kaushik Dasgupta

AMATEUR RADIO CLUB INDICTED ON FERRITE TRAFFICKING CHARGES

By K5PO on the scene
Thusday March14 2013

Vero Beach, Fla.; Feb. 6, 2013 - Members of the Boca Buena Amateur Radio Club were indicted in a Florida federal court Wednesday on ferrite trafficking charges following a lengthy DEA investigation.
The Soffit Hills DEA office has been following the club's activities since 2009, when a new ferrite blend called "Mix 31" hit the streets of Vero Beach. "We felt we had a good handle on the old 'mix 43' ferrites. The kids around here seemed to have moved onto other things, until these 'Mix 31' started showing up," said DEA Special Agent Romeo Lima.

Ferrites have been abused in the radio community for many years, but it wasn't until the "Mix 31" was introduced that abuse levels began to spiral out of control.

Dr. Milton Salandra, a ferrite addiction specialist, explains the addiction. "Most operators start by seeing a few random ferrites around the house, on things like TV and computer cables, and think they're innocuous. They'll often get a ferrite from a friend and install it on a cable to their soundcard used for digital modes. It doesn't take long for them to be itching for more, putting ferrites on every cable in the shack: coax, audio cables, USB cables, everything. The addition sets in so fast."

Dr. Salandra said that the "Mix 31" seemed to be especially devastating to the community. "The 'Mix 31' works very effectively on the HF spectrum, to which many hams are exceptionally sensitive. They claim it just cures all your RFI ills. It's such an easy trap to fall into for hams young and old."

Special Agent Lima said the radio club started by smuggling in just a few ferrites from Freeport, Bahamas, using the club president's sailboat. "They were initially just feeding their own addition, moving in ferrites to cover the vices of the radio club itself," said Lima. "But it wasn't long until they were trafficking enough 'Mix 31' to supply the entire southern coast with the illicit ferrites."

Ferrite trafficking, in quantities of one dozen or more, is a Class C felony, punishable by up to 10 years in prison and $250,000 in fines. The trial is slated for November.

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Club Meetings next month

Branch 68 - Thursday 11th April 7.30pm-Tony ZL3HAM will show a video on a recent Dxpedition—not to be missed! Host Bev ZL3OV

Branch 68 Calendar

General Meetings

Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
14	14	11	9	13	11	8	12	10	14	12	None
					Committee Meetings						
Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
28	28	25	23	27	25	22	26	24	28	None	23

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Enquiries to Denise ZL3HI, phone (03) 313 4907