

Microchips and megadeaths

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NEWSTRADE ENQUIRIES

0171 261 7704

ISSN 0959-8332

SUBSCRIPTION HOTLINE

01622 778000

SUBSCRIPTION QUERIES

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"Then I was shocked by the feeling that the skin of my face had come off. Then, the hands and arms, too. Starting from the elbow to the fingertips, all the skin of my right hand came off and hung down grotesquely. The skin of my left hand, all five fingers, all came off... Hundreds of people were squirming in the stream. I couldn't tell if they were men or women. They all looked alike. Their faces were swollen and grey, their hair standing up. Holding their hands high, groaning, people were rushing to the river... Under the bridge were floating, like dead dogs or cats, many corpses, barely covered by tattered clothes. In the shallow water near the bank, a woman was lying face upward, her breasts were torn away and blood spurting... By my side many junior high school students were squirming in agony. They were crying insanely 'Mother! Mother!' They were so severely burned and bloodstained that one could scarcely dare to look at them. I could do nothing for them but watch them die one by one, seeking their mothers in vain."

(*Eyewitness account, Hiroshima, 6 August 1945*)

Engineers played their part in the making of these events. Thirty-five years later their role has become central, for the technology of delivering death has been greatly improved. We no longer have to rely on manned aircraft to drop atomic bombs but send them as the warheads of self-guided missiles. This is where electronic engineering makes its particular contribution to slaughter, in the design of the guidance system. Consider, for example, the Trident and the Tomahawk, the two nuclear missiles which the UK Government, without benefit of open Parliamentary debate, has swung on a reluctant nation. Both of these have guidance systems which rely on advanced digital microelectronics to update an inertial navigator. In the Trident, a submarine-launched ballistic missile intended as Britain's independent nuclear weapon, the electronic system receives reference information from the optical pattern of the stars. The Tomahawk, part of a NATO arsenal that will be owned and operated by US military forces, is a cruise missile; here the electronic system receives reference information on the geographic contours of the desired route from a magnetic-core memory and information on the actual contours over which it is travelling from a radar altimeter. And such is technical progress that as we get more and more devices on a single silicon chip so we are able to kill more and more people



with a single missile.

Through work on such weapons electronics engineers in the East and the West have put themselves in the service of politicians, generals and industrialists who have become monomaniacs; who seem to see no way out of the self-perpetuating system of threat and counter-threat into which they have locked themselves and, like drug-addicts, desperately go on with it. The only thing likely to drag them out of their dementia is a threat from another direction – a concerted threat of rebellion from the trapped populations.

It becomes increasingly clear, as our distinguished American contemporary *Science* has said, "that deterrence cannot ultimately be stable, and that the civilian populations of the world are no longer defended by the armed forces for which their taxes pay, but are merely hostages to them."

None of us can be proud to serve a technology which is being used in the name of "defence" as a means to attain immense human suffering. Because we know what this technology can do we should be among the leaders of dissent." ■

This remarkable leader first appeared in *Wireless World*, November 1980. It was written by Tom Ivall, then editor of *Wireless World* and one of the most polite, considerate and intelligent men I have had the pleasure to work with. He died on 12 October 1997, but since he taught me all I know about producing the magazine, his influence lives on.
Martin Eccles.

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Electronics World is published monthly. By post, current issue £2.35, back issues (if available) £2.50. Orders, payments and general correspondence to **L333, Electronics World, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS**. Tlx: 892984 REED BP G. Cheques should be made payable to Reed Business Information Ltd
Newstrade: Distributed by Marketforce (UK) Ltd, 247 Tottenham Court Road London W1P 0AU 0171 261-5108.

Subscriptions: Quadrant Subscription Services, Oakfield House Perrymount Road, Haywards Heath, Sussex RH16 3DH. Telephone 01444 445566. Please notify change of address. Subscription rates 1 year £32 UK 2 years £43.00 3 years £75.00. Surface mail 1 year £37.00 2 years £60.00 3 years £86.00 Air mail Europe/Eu 1 year £46.00 2 years £73.00 ROW 1 year £56.00 2 years £89.00

Overseas advertising agents: France and Belgium: Pierre Mussard, 18-20 Place de la Madeleine, Paris 75008. United States of America: Ray Barnes, Reed Business Publishing Ltd, 475 Park Avenue South, 2nd Fl New York, NY 10016 Tel: (212) 679 8888 Fax: (212) 679 9455

USA mailing agents: Mercury Airfreight International Ltd Inc, 10(b) Englehard Ave, Avenel NJ 07001. Periodicals Postage Paid at Rahway NJ Postmaster. Send address changes to above.

Printed by BPPC Magazines (Carlisle) Ltd, Newtown Trading Estate Carlisle. Cumbria, CA2 7NR

Typeset by Marlin Imaging 2-4 Powerscrot Road, Sidcup, Kent DA1 4 SDT.

© Reed Business Information Ltd 1997 ISSN 0959 8332