

4. Defences down

In the fourth report from his Secret Society BBC-2 TV series, DUNCAN CAMPBELL reveals that every major new radar defence system since 1945 has been a failure. Four billion-pound projects have gone wrong — and more disasters are on the way

BRITAIN'S AIR DEFENCES have been unable to do their job almost continuously since the end of the Second World War. Now, in the view of the RAF's most senior officers, the air force is 'incapable of defending Britain from large-scale enemy attack'. That's what the air staff told the *Sunday Telegraph* one month ago. Investigating the past, present, and future of RAF radar systems, *Secret Society* found that governments have invariably concealed and covered up problems with radar — until it was far too late.

In the last six months, two major technical setbacks have centred on radar equipment ordered from the GEC-Marconi group. Some £930 million was thrown away when the Nimrod early warning aircraft system had to be scrapped last December.

It will cost £860 million to replace it with a half-size fleet of American-built AWACS. It will also mean a delay of nine years in getting any modern airborne warning system into operation.

One month after the Nimrod cancellation, defence workers leaked information to MPs that the £650 million GEC 'Foxhunter' radar system for the Tornado fighter aircraft was also technically deficient. To mask the fact that the Tornado's specially-designed radar doesn't work and can't be installed, some of the pride of the RAF's fighter force now fly with sacks of concrete in their nosecones. So the fighters the Tornados should replace, 30-year-old Lightnings, are still being kept going — though they leak oil so profusely they are a major safety hazard, and parts have been observed to fall off as they prepare for flight.

Senior military officers try to make the best of the shambles of front-line radar and air defence equipment. Air Chief Marshal Sir Peter Harding, the Commander in Chief of UK Air Defence Region, told me last year that although the RAF's Bloodhound missile force — a 30-year-old castoff from forces in Germany — were rather long in the tooth 'like an 18th century knife that's had four new blades and three new handles', they could 'go on for a very long time'.

The existing early warning squadron, a few Shackletons originally designed in 1941, were, says Harding, 'better than nothing'. But it was scarcely reassuring that the RAF were having surreptitiously to cannibalise parts from kindred aircraft on museum display in order to keep the defence line operating out over the North Sea.

Hardly more reassuring was the Air Chief Marshal's candid evaluation of another problem radar system, called IFF. When it was put to him that it doesn't work — and when it goes wrong, the RAF and NATO will lose many aircraft to their own side — Sir Peter agreed. IFF problems will cost the RAF aircraft and lives — but the same difficulty afflicts Warsaw Pact air forces. 'They have [an IFF problem] too', he pointed out. 'And, of course if they have many more aircraft than we do, then they have many more chances of shooting down their own aeroplanes than we do ours.'

Woolly sausages

In the early days of the Second World War, the first pioneering radar network, Chain Home, was erected right across Britain. It has since been completely revamped twice — on both occasions with a marked lack of judgment or success. The third revamp is now under way, and early signs suggest that it is already as big a problem as the

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projects it replaces.

The 'Rotor' system, installed in the early 1950s, was the first revamp of the old radar chain. The surprise explosion of the first Soviet A-bomb in 1949 led quickly to a panic to re-arm and to protect military installations from atomic attack. Irrespective of the effectiveness or obsolescence of the radar equipment then installed, no less than 80 radar stations and 1,600 radar monitoring positions were relocated underground, sometimes very deep underground.

The Rotor plan took five years to complete, sparing little expense to construct what was in effect a British underground electronic Maginot Line. Yet even the best radar then available was short-range, and with an erratic and unreliable display screen. Former fighter controller John Bushby recalled that:

[The] blip which . . . represented the aircraft was always referred to as a sausage because it was an enormous long woolly sort of blob on the tube . . . any accuracy in aircraft positioning was more by judgment [than] by instrument.

In 1955, a new and long-range 'Type 80' radar quickly showed that most of the costly Rotor network should be made redundant. The 1950s equivalent of computer software — numerous WRAFs and plotting boards — meant that fast jet aircraft could have gone home by the time plotters caught up with their position. According to Bushby, a fighter controller could be ordered to attack an invader but then 'look on his radar tube and there wasn't a thing in the sky'.

The Rotor plan came to a quick, costly and secret end. Of 75 stations in the original Rotor network, 30 had closed by the start of 1958. By 1959, 61 stations had closed. By 1964, only five radar stations were left. Most of the Rotor underground fortresses were left, desolate and derelict, as they remain today.

Although the Soviet Union could hardly have failed to note that 70 of 75 British radar stations had rapidly gone off the air, the British public and Parliament were left in complete ignorance. There were no leaks, no debates, and no parliamentary questions. The one and only officially authorised report about Rotor appeared in the *Financial Times* in June 1961. The report noted the Marconi company's magnificent efforts in constructing Rotor and praised the network as 'ultra sophisticated'. But it omitted to mention that the entire system had been dismantled three years previously.

Baroque system

The H-bomb era of the 1960s presaged a new type of radar network. Plans for immediate nuclear retaliation meant that all that was needed from radar was a tripwire to say that an attack was coming. Then the V Bombers would take off. A new plan, codenamed Linesman, involved only three RAF radar stations and one giant new headquarters, intended as a single top-level and top-secret national defence control centre.

A network of Post Office towers was built to relay radar screen 'pictures' to the new Post Office tower in London. From there secret links transmitted the complete radar information to the national control centre at West Drayton near Heathrow airport. This was the heart of Linesman. There, the entire radar defence

More on 'Secret Society'

THE BBC has so far refused to transmit the fifth programme in the *Secret Society* series, 'Power Play', 'in a pre-election period'. The programme deals with unusual tactics adopted by the last two outgoing governments (Labour in 1979, Mrs Thatcher in 1983) to control public opinion and to stay in power at a time of a general election. The programme — which although untransmitted has already provoked extensive attacks on the BBC by Conservative lobby groups — was originally cleared in January 1987 by the former Director-General, Alasdair Milne, but the clearance was withdrawn by successor Michael Checkland.

The contents of the sixth, originally banned, programme, on the concealment of the Zircon spy satellite project from Parliament, were published by the *New Statesman* in January. Although the Home Secretary has stated that transmission of Zircon is up to the BBC, the Glasgow Procurator Fiscal service is still insisting on keeping every available transmission copy of the Zircon programme. Two weeks ago, BBC officials stated that the Director General 'would not consider' reassembling the Zircon programme until the police agreed to hand the original tapes back. ●

network was to be computerised, using specially built new computers from the Plessey company (then the Automatic Telephone and Electric Co). The computers were to run everything. In an ugly chequered brown building codenamed L-1, huge coloured screens should be able to portray the changing defence situation to watching military chiefs.

A major snag in the Linesman computer plan was that the Automatic Telephone and Electric Co didn't build computers. It built telephone exchanges. And for Linesman, they built computers that looked and operated just like telephone exchanges, offering for the heart of the nation's defence a computer system with less reliability even than the Post Office STD telephone system of the 1960s. The Linesman computers never worked; they couldn't communicate with each other, were perpetually overloaded, and continually broke down. According to Linesman programmer Mel Wallis, the system 'never did operate'. Outside experts were sent to West Drayton to try to sort out the computer problems — but, says Wallis, soon retreated in 'despair'.

Secret Society obtained computer specifications which describe for the first time what the doomed Linesman computers were actually supposed to do. The documents reveal that the computers were built before anyone had any idea how to write programmes for them — a bit like building a car before you realised that it might need wheels as well as an engine. Computer expert Guy Kewney studied the 'Restricted' plans and observed that:

You would have been very lucky, I think, to have it going for maybe ten minutes a week . . . It was incredibly slow. It could perhaps have run a reasonably successful Traffic Management Scheme for a local borough council.

The L-1 centre had never been operational, and so the RAF's erstwhile grandiose national HQ lies gloomy and dust-layered, 'scrap' signs adorning the many rows of radar consoles. When it was finally written off in 1975, it had taken ten years and more than £200 million (in 1973 terms) to get nowhere. The whole RAF radar system had to be thrown back on operators at the three main outlying radar stations. Consultant Ray Curnow was one of the people asked to help try to sort Linesman's problems in the early 1970s. But salvage was impossible, according to Curnow. 'It was a real baroque system — incompetently managed, conceived and executed.'

Half-blind

Linesman also had some special vulnerabilities. Even if the computers and radar screens worked, there was one serious problem. The national control centre, computers, operators and all, were situated above ground. Just one high explosive bomb on West Drayton could have destroyed the lot. Moreover, all the data from the Post Office Tower was to be fed by various means to West Drayton, including an underground telephone cable running through Bayswater. The cable ran more or less directly underneath part of the Soviet Embassy. It was some years before anyone noticed that this could perhaps be a problem, and it was rerouted.

But the public and Parliament heard nothing official about these problems. The more things went awry, the greater the volume of inspired articles planted on reliable hacks and defence correspondents. In 1969, as despair at West Drayton became total, the *Daily Mirror* reported that:

Linesman . . . will be a refreshing change from the parade of costly flops.

The truth was that the RAF soon had to inform the government that the project was 'so obsolete, it could not cope with any air threat'. Staff at the computer centre tried to alert MPs, without tangible results. When the project came under increasing criticism, a Parliamentary Select Committee asked for a full report. They never got it. All hope of using West Drayton as a control centre was abandoned, and the computers, which had still never worked, went on the scrapheap. Linesman was quietly and unceremoniously buried.

After the Linesman flop, an RAF team set about planning a new radar defence system for the late 1970s and 1980s. The new system was called the UK Air Defence Ground Environment (UKADGE). UKADGE's first problem was with the gaps which had opened up during the Linesman era. New types of hostile aircraft could easily fly across the sea at low level, underneath the umbrella of the giant east coast radar stations, and invisible to the radar watchers. Second, the longer range of more modern Soviet aircraft meant that they could sneak up on Britain from behind — from the west. What was left of Linesman was thus shown to be half-blind and looking avidly in the wrong direction. But all Britain's radar defences in the west had been closed down completely 20 years earlier, in a late, cost-cutting phase of the Rotor scheme.

A crash programme was announced to cover the threat from the west. New stations were built, and

ageing Shackleton surveillance aircraft revived and fitted with long-range radar. Improvements, which were added in a strictly *ad hoc* fashion, remain to this day. One of the most important front-line radar stations, at Buchan in northwest Scotland, now operates with a unique combination of an odd radar seized from Argentina in the Falklands war, and a 30-year-old 'Type 80'.

The new UKADGE system involves the construction of 11 large underground controls, a new communications network, and a chain of mobile radar stations which can move from position to position by road. It was originally supposed to come into service this year, but has 'slipped a little'. A key component of UKADGE was to have been the Nimrod early warning aircraft, itself due in service in 1984.

Nimrod failed because its computers and radar system have never worked even to a minimum official specification. One of the more spectacular problems occurred when it tried to track enemy aircraft flying over Britain, and was found unable to distinguish hostiles from cars travelling at high speed on motorways. Throughout 1986, GEC tried increasingly desperately to produce solutions to this and other problems.

To sort out articulated lorries from enemy helicopters and missiles, GEC had to install yet another computer inside the already tightly packed Nimrod. The problem was then shown to be 'solved' in July 1986 by the publication in the press of pictures of a large black box, prominently bearing the label 'GEC Avionics — vehicle correlator'. It had two switches, and when switched on, eliminated vehicle tracking — but only at the expense of not spotting slow moving enemy aircraft either. In the autumn of 1986, Defence Secretary George Younger ordered a final, deciding playoff between Nimrod and the American AWACS. Nimrod lost. Meanwhile, the RAF has to make do with what it can 'beg, steal or borrow' in the way of the existing NATO AWACS aircraft.

Friend — or foe?

Apart from Nimrod and the Foxhunter radar, the UKADGE system faces a number of other important defects. Because the UKADGE computers aren't yet installed or working, major stations like Boulmer in Northumbria are in danger and difficulty. For more than five years, Boulmer's operations room has been housed in a prefabricated building called BIF, protected from

attack by a few inches of wood. They're very vulnerable. But until their underground bunker is open again, as a working part of UKADGE, there is nowhere else for them to go. Air Marshal Harding agrees that the delay is unwelcome; he 'will be a lot happier when it is all underground'.

But the time when RAF Boulmer can go back underground has been held up by computer software problems. First, the contracting companies argued about which computer they would choose, and then about which programming language. They found that some of the computers they received were incompatible with each other. All the computers are made to commercial, not military specifications, and are thought likely to be electronically 'knocked out' by any nuclear explosion.

‘In any real crisis RAF aircraft are simply not safe around British shores, being liable to be shot down by the RAF itself’

Much of the UKADGE communications network is uninstalled, or delayed. And even some of the new communications systems create problems. Radio links between ground stations and NATO AWACS, a system called Link 11 is, according to RAF officers, 'very easily jammed' by the other side. Sometimes, they find they accidentally jam it themselves. The former Ministry of Defence Chief Scientific Adviser, Professor Sir Ronald Mason, told me last summer that 'you're highlighting quite rightly' important problems with UKADGE. But he still felt that it was 'in very good shape'.

But even when UKADGE and Britain's AWACS force *are* in operation, the government will have to face another billion-pound radar problem — the Identification of Friend or Foe, or IFF system. Like an old medieval watchkeeper, an IFF radar scanner electronically hails each passing aircraft, asking them if they be friend — or foe. A radar signal is sent back, and displayed to watching radar controllers.

But that's only in theory. IFF is old, and unreliable. It often produces wrong results, and

can easily be made to produce false results. The Soviet Union knows exactly how it works, not because of a spy in the RAF, but because Britain officially sold them the whole system in the 1960s. Nowadays, even Aeroflot airliners carry IFF systems based on the RAF design.

Because of this, in any real crisis, RAF aircraft are simply not safe around British shores, being liable to be shot down by the RAF itself. So NATO aircraft in these circumstances can only come or go from Britain by moving through special sanctuary zones — secret routes, not marked on any normal map, where missile controllers have been told not to fire at all. It's neither a comfortable nor an adequate system for pilots. The risks are real, too. After four years of secrecy, it was officially admitted a year ago that the deaths of four soldiers in the Falklands in 1982 had been caused by a British missile. Their Army helicopter had been misidentified through an IFF error, and then attacked and shot down by a Navy destroyer.

The House of Commons have been told that a new NATO Identification System will cost Britain at least 'hundreds of millions' of pounds. But NATO has yet to reach agreement about what standard to adopt, despite 15 years of argument. What's left at the moment is almost a 'shambles', according to Professor Mason:

That would be too strong a word. But certainly our arrangements for IFF at the moment are far from valid. It certainly doesn't work.

So shooting down most of our own side would, in the heat of battle, 'be a real possibility'. That would be perhaps the most dramatic result of a series of major failures by contractors to meet RAF specifications, compounding earlier errors of official judgment about what might be required or achievable for Britain's air defences.

The RAF's willingness to advertise its myriad problems by leaking to the *Sunday Telegraph*, or by being relatively open before *Secret Society* cameras loudly testified to the authenticity of their concern. They face many big problems, and money to solve them is tight. But they are less prepared to face some of the obvious reasons for their difficulties. Money is tight most of all because of the Conservative exceptionally costly nuclear obsession with Trident. And the cutting edge of market forces fails utterly to work on contractors who have long thoroughly penetrated the upper echelons of Whitehall and the armed forces. Both these aspects of a British military-industrial complex are demonstrably inimical to the national interest. □

