

## **TOPS - British Railways' first computer based train operating system**

TOPS was a computer system implemented by British Railways from August 1973 onwards to control its freight traffic. TOPS allowed British Railways to keep tabs on its rolling stock across the whole rail network. Costing £16.6 million, it was based on two IBM 370 mainframes installed at Marylebone in London.

TOPS was developed in the USA through a collaboration between IBM and Southern Pacific. Early versions of TOPS implemented on North American freight railroads were constrained by point to point communication along single phone lines. This was sufficient for US railroads accustomed to running just one train a day from each freight yard. The British Railways version of TOPS was noteworthy for pioneering multiplexing for computer communication across a national network. Southern Pacific had just 400 trains a day and 88,000 wagons in the early 1970's. But multiplexing was necessary for the British Railways freight system with some 360,000 wagons, 3,500 daily trains and multiple terminals at major marshalling yards.

The software used was TOPSTRANS, essentially a set of IBM Macros which would call forth the appropriate sub-routines and activate drives. The software ultimately had its origins in the US Strategic Air Command's SAGE – Strategic Air Ground Environment - system which provided early warning of Soviet bomber attacks on the US mainland. TOPS was not so much swords into ploughshares as Cold War to Coal Trains.

The National Railway Museum York and Alliance Manchester Business School are now researching the history of British Railways' first computer based train operating system. The Railway Museum is part of the Science Museum organisation.

The aims of the research are to understand the history of computerisation on British Railways. This will help develop a picture of the impact of the railways on society and their contribution to modern management. The research will underpin new displays at the Museum at York and supplement the Museum's rich oral history archive. TOPS is regularly mentioned in the reminiscences of railway staff in the National Archive of Railway Oral History held at the Railway Museum.

The two researchers – Jonathan Aylen from Manchester and Bob Gwynne from the National Railway Museum are seeking participants in the implementation of the TOPS scheme. Bob Gwynne says:

“The adoption of TOPS by British Rail in the late 1960's is a neglected part of the history of railway modernisation. NRM holds archives in this area but would be interested in gathering further material and possibly reminiscences from those who introduced the system to BR. This would be for the benefit of future research and to influence the development of display material on the floor of the museum. “

The Museum in York is fortunate to have a substantial archive on TOPS donated from the training train which travelled around the country during the “cut-over” phase of implementation, moving from region to region as the computer system rolled-out.

As with many automation systems, TOPS forced the introduction of new management processes and shaped the way the railway operated. For the first time, there was a systematic inventory of railway assets with a consistent numbering system. At its heart was a “Doomsday Book” listing of every freight sidings, every operator and every cargo carried (though some consignments were concealed for security reasons.) So it was not just an automation system but a step towards modern management of railways in the UK.

Jonathan Aylen is concerned with the way in which technology evolves - how it shapes business organisations and, in turn, is influenced by existing routines and operating practice. He has previously written on the history of process control computers, including the development of Ferranti Argus for both guided missiles and ICI chemical plants and the use of computers in the steel industry. Jonathan says that “TOPS is at the hinge of history – it represents a shift from traditional craft based railway practice to the modern automated systems we know today.”

So were you a TOPS developer or user? Did you write TOPSTRANS software for British Railways, or help implement the scheme on the ground? Do you have knowledge of the pre-history of TOPS in the USA and its origins in IBM and Southern Pacific Railroads? Are you familiar with the origins of the IBM software in the US defence sector? If so, the researchers would be keen to hear from you.

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