



been largely superseded by other languages such as Boolean logic, and so the presence of controllers or other devices in a process control system which rely on ladder logic can cause problems in maintaining, updating and configuring process control systems. The application suggests that personnel responsible for maintaining process control systems are now finding it easier to use higher level programming languages using Boolean logic and are becoming less familiar with the legacy language of ladder logic.

- 5 The application states that one solution to this problem is to translate ladder logic control routines into Boolean logic so that individuals more familiar with Boolean logic can diagnose problems or design improvements in a more familiar programming environment. It goes on to say that since this translation is often performed manually, the process of translation from ladder logic to Boolean logic can be time-consuming and prone to errors. Automatic translation systems are known to a limited extent, but the application suggests that these are unsatisfactory, for example because the results are not available in a manner which supports further design, configuration and maintenance of a process control system. The invention consists of a particular set of steps for automatically converting ladder logic into Boolean logic where the above problems are overcome.
- 6 At the hearing, it was not necessary to consider the conversion steps in any particular detail other than to acknowledge that nothing similar had been identified in the examiner's search of the prior art. The application as it currently stands has three independent claims, claims 1, 15, and 26, to a method, system and a computer program for computer-implemented conversion of ladder logic into Boolean logic.

### **The law**

- 7 The relevant provision in relation to excluded inventions is section 1(2), which reads:

*It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of –*

*(a) a discovery, scientific theory or mathematical method;*

*(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;*

*(c) a scheme, rule or method for performing a mental act, playing a game or doing business or a program for a computer;*

*(d) the presentation of information;*

*but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.*

- 8 The examiner argues that the invention consists of nothing more than a program for a computer or a mental act as such, and is excluded under section 1(2)(c).

The test for deciding whether a computer-implemented invention is patentable was recently considered by the Court of Appeal in the case of *Symbian*<sup>1</sup>, and at paragraph 48 of its judgment the Court says that the issue has to be resolved by answering the question of whether the invention reveals a technical contribution to the state of the art. The Court of Appeal proceeded to answer this question with the aid of the four-step test set out in its earlier judgment in *Aerotel*<sup>2</sup>, which it says is intended to be in substance the same test as that relied on in prior UK case law, namely the “technical contribution” test.

### Arguments and analysis

- 9 In line with guidance set out in the UK Intellectual Property Office’s Practice Notice issued 8<sup>th</sup> December 2008<sup>3</sup>, the examiner has applied the structured approach set out in *Aerotel* to address the question of whether the invention relates to excluded subject matter. The same approach has been followed by Dr Lockey in his own assessment of whether the invention is patentable, but inevitably the end result differs to that of the examiner. At the hearing, Dr Lockey agreed that this difference in end result arises not through any misunderstanding of claim construction or a failure to properly identify the actual contribution, i.e. steps 1 and 2 of *Aerotel*’s four-step test, but in resolving the fundamental question of whether the contribution is technical.
- 10 Dr Lockey referred to a number of authorities in support of his argument that the contribution made by the invention, namely a method or apparatus for automatically converting process control routines in a process control system from ladder logic to Boolean logic, should be regarded as technical. I shall deal with each of these authorities in turn, but the basic thrust of his argument is that the conversion process is not claimed in the abstract, but is specifically directed to the conversion of process control data in a process control system. The conversion process provides the benefits of fast and reliable conversion of control data in a technical environment, and ought therefore to be regarded as technical.
- 11 In the EPO Board of Appeal decision in *Vicom*<sup>4</sup>, the Board states that a method for digitally filtering data remains an abstract notion not distinguished from a mathematical method as long as it is not specified what physical entity is represented by the data. The mere fact that the filtering was to be performed on a computer was not in itself persuasive. An amendment to direct the claimed invention to a method of processing image data was held to be allowable, as this was considered to be a technical process. Dr Lockey suggests that this is analogous to the present application. The claimed method and apparatus use a particular method to automatically convert control data from one type to another, and the steps of that method are explicitly included in the claims. The conversion method is not claimed in isolation, but specifically for converting process control data in a process control system, with the advantage of faster and more reliable conversion. Dr Lockey noted that the Board’s reasoning in *Vicom* was approved by the Court of Appeal in *Symbian*.

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<sup>1</sup> *Symbian Ltd. v Comptroller-General of Patents* [2008] EWCA Civ 1066

<sup>2</sup> *Aerotel Ltd v Telco Holdings Ltd and Macrossan’s Application* [2006] EWCA Civ 1371

<sup>3</sup> <http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm>

<sup>4</sup> T208/04

- 12 In the case of *Halliburton*<sup>5</sup>, Pumfrey J says that claims to a method of designing a drill bit are to be regarded as a mental act notwithstanding the fact that the method would be performed by a computer program. In his judgment, Pumfrey J goes on to say that such claims would be curable by amendment to a process of manufacturing a drill bit using the design process. Dr Lockey submits that the present claims are consistent with *Halliburton* in that they relate to a specific technical use of a potentially abstract contribution, and so are not excluded. I should note at this point that Pumfrey J's comments regarding the curable amendment are strictly *obiter*.
- 13 At the hearing, I agreed with Dr Lockey's general assessment of *Vicom* and *Halliburton* as set out above, but suggested that in *Vicom* there was a further, more fundamental, consideration that persuaded the Board of Appeal to regard the invention as having technical character, i.e. the end result. In *Vicom*, the contribution lay in improving the resolution of an image by subjecting image data to a new and inventive mathematical technique. The end result was a different, and arguably better, physical image. The same can be said to some extent of *Halliburton*, where the method of designing a drill bit would have been regarded as technical if tethered to the production of a physical drill bit regardless of the originality of the bit itself.
- 14 In the present application, the contribution is a method for automatically converting process control routines from ladder logic to Boolean logic in a process control system. In other words, a computer program for converting coded routines from one language into another for use in a process control system. Dr Lockey acknowledged that the resulting Boolean logic would be no different to that derived through manual conversion, but had the benefit of being less prone to human errors and produced in less time.
- 15 From the authorities cited above, the mere fact that the contribution is made in the field of computing is clearly not enough for it to be regarded as technical. Something additional is required, i.e. the end result of the improved image in *Vicom* or the drill bit in *Halliburton*. In the present case, the end result is an "abstract" set of known instructions for controlling conventional devices in conventional ways. I use the word abstract in the sense that it is not the nature of the instructions that is important; it is the speed and the reliability in which the instructions are produced, not the instructions themselves or the consequences of those instructions. I consider that this sufficiently distinguishes the present application from *Vicom* and *Halliburton* to justify reaching a different conclusion on the question of whether a technical contribution is made.
- 16 The invention consists of a particular method for converting instructions expressed in one language into another, and the benefits it provides, i.e. speed and reliability of conversion, are only achieved through implementation on a computer. This clearly points to the invention being a computer program. The question I now need to answer is whether the invention reveals a technical contribution to the state of the art, and will do so in the same way that the Courts and the EPO have done so, that is by considering first the problem the invention aims to resolve and then the way in which the solution is achieved. It is important

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<sup>5</sup> *Halliburton v Smith* [2005] EWHC 1623 (Pat)

to note at this point the comments of the Court of Appeal at paragraphs 52 and 53 in *Symbian* (where reference to Article 52(2)(c) of the EPC has the same effect as section 1(2)(c) of the Act):

*52. These considerations also manifest the difficulty of formulating a precise test for deciding whether a computer program is excluded from patentability, and suggest that it could be inappropriate to accept either of the rival simple propositions (summarised at [17] above) advanced by the parties here. Bearing in mind the multifarious features of computer programs and the unpredictable developments which will no doubt occur in the IT field, we believe that it would also be dangerous to suggest that there is a clear rule available to determine whether or not a program is excluded by art 52(2)(c). Each case must be determined by reference to its particular facts and features, bearing in mind the guidance given in the decisions mentioned in the previous paragraph.*

*53. Based on these principles, we consider that Patten J was right and that the claimed invention does make a technical contribution, and is not therefore precluded from registration by art 52(2)(c).*

- 17 The problem addressed by the invention is how to improve the speed and reliability of converting control routines expressed in one language into another language over and above what can be done manually. The problems of poor speed and reliability are not technical problems in the sense that they affect the performance of the computer in any way, but are merely indicative of the operational expectations and requirements of human operators. The solution is a conventional computer operating in accordance with instructions for converting ladder logic into Boolean logic. The computer itself is not faster or more reliable as a result of the invention; it is only the process of conversion that benefits from these advantages. There is also no improvement in the process control system itself. In my view, the solution is clearly not technical.
- 18 Taking all of this into account, I find that I agree with the examiner that the invention relates to a computer program and is therefore potentially excluded from patentability under section 1(2)(c). I have identified the contribution made by the invention, and found that it is not technical and therefore not capable of making an otherwise excluded invention patentable. Although I have not considered whether the invention relates to the mental act category set out in section 1(2)(c), I do not consider it necessary for me to do so in the light of my finding that the invention is a computer program as such.

## **Conclusion**

- 19 The invention claimed in the application is a program for a computer as such and is excluded from patentability under section 1(2)(c). I have reviewed the application in its entirety and have been unable to find anything that can form the basis of a patentable invention. I therefore refuse the application under section 18(3).

## **Appeal**

- 20 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

**H Jones**

Deputy Director acting for the Comptroller