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For Creativity and Innovation

BL O/238/08

13 August 2008

PATENTS ACT 1977

APPLICANT Fisher-Rosemount Systems, Inc.

ISSUE Whether patent application number GB 0426501.3 complies with sections 1(1)(a) and 1(2)

HEARING OFFICER R C Kennell

DECISION

1 This application was filed on 3 December 2004, claiming a priority of 3 December 2003 from an earlier US application. It was published under serial no. GB 2409293 A on 22 June 2005.

2 Although the claims have been amended during substantive examination, the applicant has been unable to persuade the examiner that the invention is new as required by section 1(1)(a) of the Act or that it is patentable within the meaning of section 1(2). These matters therefore came before me at a hearing on 16 July 2008. The applicant was represented by its patent attorney, Dr Alex Lockey of Forresters, and the examiner, Mr Mark Edwards, assisted via videolink.

The invention

3 The invention provides an adaptation strategy for the multivariable controllers (those which provide simultaneous control of two or more variables based on one or more inputs) which are commonly used in complex automated systems such as manufacturing plants and chemical refineries. In order that the controllers can adapt during runtime and provide more effective control, the invention models the process as two or more single-input single-output (SISO) models and selects a subset of the SISO models for adaptation. As the specification explains, adaptation of all the SISO models in the system may not be necessary when the modelling error on some outputs is insignificant, or there is no correlation between the error on a particular output and one or more inputs, or the changes in some inputs are insignificant.

4 As originally drafted, the claims were directed to adapting the process model, but

following amendment the main claims now read:

> "1. A method of controlling a process comprising:
> implementing a multivariable process model in a process controller, the multivariable process model being made up of two or more single-input single-output (SISO) models;
> determining that adaptation of the multivariable model is needed;
> selecting a subset of the SISO models to adapt;
> individually adapting each SISO model of the selected subset of SISO models;
> providing the subset of adapted SISO models to the process controller to be included in the multivariable process model; and
> using the controller to manipulate a process input variable based on the multivariable process model."

> "20. A process control system, comprising:
> a process controller implementing a multivariable process model made up of two or more single-input single-output (SISO) models, for controlling one or more process variables; and
> a model adaptation unit communicatively connected to the process controller configured *to adapt the multivariable process model to process conditions*, the model adaptation unit including;
> a first unit for determining that adaptation of the model is necessary *based on process conditions*;
> a second unit adapted to select a subset of the SISO models for adaptation;
> a third unit adapted to alter each of the SISO models in the selected subset of SISO models; and
> a fourth unit adapted to provide the altered SISO models to the process controller to be included in the multivariable process model;
> wherein the process controller controls the one or more variables based on the multivariable process model *including the altered SISO models*." ;

the highlighted wording in claim 20 is discussed below.

The law and its interpretation

5 Section 1(1)(a) requires no further elaboration. Section 1(2) 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."

6 It is not disputed that the assessment of patentability under section 1(2) is governed by the judgment of the Court of Appeal in *Aerotel Ltd v Telco Holdings Ltd* and *Macrossan's Application* [2006] EWCA Civ 1371, [2007] RPC 7 (hereinafter "*Aerotel*"). In this case the court reviewed the case law on the interpretation of section 1(2) and approved a four-step test for the assessment of patentability, namely:

1) Properly construe the claim

2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution)

3) Ask whether it falls solely within the excluded matter

4) Check whether the actual or alleged contribution is actually technical in nature.

7 The operation of the test is explained at paragraphs 40-48 of the judgment. In particular:

- Paragraphs 41 and 47 explain that the test is consistent with the principles established in previous decisions of the Court of Appeal, and is a re-formulation in a different order of the approach in *Fujitsu*[1], asking the same questions but in a different order.

- Paragraph 43 states that identification of the contribution is "an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are"; it is essentially a matter of determining what it is the inventor has really added to human knowledge, and involves looking at substance, not form.

- Paragraph 46 explains that, although the fourth step of checking whether the contribution is technical may not be necessary because the third step should have covered the point, it is a necessary check if *Merrill Lynch*[2] is to be followed.

Argument and analysis

Novelty

8 Notwithstanding the amendment, the examiner thought that clams 1 and 20 and some of the dependent claims might still be anticipated by US 2003 / 0120361 A1

[1] Fujitsu Ltd's Application [1997] RPC 608
[2] Merrill Lynch's Application [1989] RPC 561

(Anderson et al) cited earlier in the proceedings. As he explained, the Anderson model consisted of a plurality of sub-models corresponding to various processes within the plant. It received measured data from the plant and generated a range of outputs based on the internal model/rules of the various subsystems, the outputs being transferred as new setpoints for the SISO controllers that were used to control the system. The SISO controllers were therefore updated to provide a better response to changes in the process, but only a subset of the controllers would be adapted each time the model was changed.

9 However, Dr Lockey argued that the Anderson model generated outputs to set the control points of individual, distributed SISO *controllers* and that that the document taught neither the making of the model out of a plurality of SISO *models*, nor the selection of any subset of models for adaptation. I agree; I do not think that (as the examiner argued) altering the setpoints on some of the SISOs equates to the adaptation of a subset of SISO models.

10 The invention as now claimed is therefore new in regard to Anderson.

Excluded subject matter

11 In correspondence before the hearing the examiner took the view that (as indeed appears from the introductory part of the specification) process control systems which used single SISO models for each input variable and adapted them based on process conditions were known, but not the use of a plurality of SISO models for a multivariable process control system. He therefore regarded the latter as the contribution and considered it to be excluded as a mathematical method and as a computer program, since essentially the SISO models were nothing more than computer implemented mathematical models whose adaptation was an exercise in programming. However, in the light of the arguments developed at the hearing, he was prepared to concede that the claims could be tethered to process control so as to take the invention outside the section 1(2) exclusions – but did not think that Dr Lockey's proposed wording had in fact provided the necessary "feedback loop" between the alteration of the model and the control of the process.

12 Notwithstanding the view of the late Pumfrey J (as he then was) in *Halliburton v Smith International* [2005] EWHC 1623 (Pat), [2006] RPC 2 and *Cappellini/Bloomberg LP* [2007] EWHC 476 (Pat) that the section 1(2) exclusions are ultimately a matter of the scope of the claims, I think that in deciding this matter I am bound to follow the four-step *Aerotel* test. There being no dispute, and to my mind no problem, about the construction of the claims in the first step, the matter will turn on the correct identification of the contribution of the invention in the second step. I think it would be idle to pretend that the contribution can be determined entirely without reference to what the applicant is actually claiming as the invention, but as I have noted above it must fundamentally be determined as a matter of substance rather than form of claim.

13 Dr Lockey was at pains to stress that the invention was directed neither to SISO models as such nor to adapting a plurality of SISO models for use in a multivariable model as such. As he put it in a submission before the hearing, the

invention was directed to a new and improved process control system with a model which received inputs from the process and was used to generate control outputs to control the process, *and which was adaptable in response to a detected disturbance or deviation between the model and the operation of the process*.

14 If as paragraph 43 of *Aerotel* directs me I look at what problem the invention is solving and how it works, then I think that, analogous to the earlier Fisher-Rosemount decisions BL O/148/07 and BL O/150/07 to which Dr Lockey referred me, there is indeed a contribution extending beyond simply adapting a multivariable process model (the form in which the invention was originally claimed) to include also the way in which the process is controlled.

15 In my view this contribution does not relate solely to excluded matter and is technical in nature. It therefore passes the third and fourth *Aerotel* steps.

16 The question than remains whether the claims are properly tethered to this contribution and here I share the reservations of the examiner. As he pointed out, claim 1, unlike the highlighted wording in claim 20, does not bring out the feedback loop whereby the determination that adaptation is needed is based on the detected process conditions and that the process controller acts to control the process on the basis of the adapted model including the altered SISO models in the selected subset.

Conclusion and next steps

17 I therefore conclude that although the contribution passes the *Aerotel* test, claim 1 requires amendment in order to tie it to that contribution and avoid objection under section 1(2). I am satisfied that claim 20 correctly reflects the contribution and is not open to objection under section 1(2).

18 I therefore give the applicant a period of 28 days from the date of this decision to submit amended claims which overcome my finding in relation to claim 1. Since this period is specified in proceedings before the comptroller, in accordance with section 117B(5) it cannot be extended under section 117B(2).

19 The application as originally filed contained claims to a model adaptation unit in the form of a program stored on a computer readable medium. The applicant withdrew these claims in the light of the case law as it then stood. Following the subsequent judgment in *Astron Clinica Ltd* [2008] EWHC 85 (Pat), [2008] RPC 14 it is open to the applicant to reinstate claims of this form if it so wishes, provided that any such claims reflect the features of the invention which would ensure the patentability of the method which the program is intended to carry out when it is run.

20 If I am satisfied that any amended claims are not excluded under section 1(2), I will refer the application to the examiner to continue substantive examination. However, the compliance period prescribed by rule 30 of the Patents Rules 2007 for putting the application in order, as extended under rule 108(2), expired on 3

August 2008. The applicant will therefore need to request a discretionary further extension under rule 108(3) by 3 October 2008 if the application is to proceed.

Appeal

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

R C KENNELL
Deputy Director acting for the Comptroller