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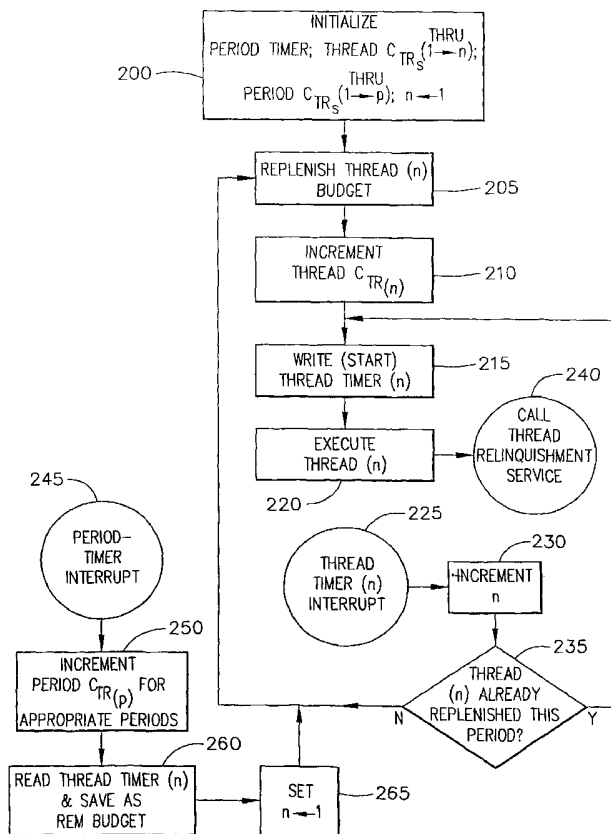
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[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR ROBUST TIME PARTITIONING OF TASKS IN A REAL-TIME COMPUTING ENVIRONMENT



(57) Abstract: A time-partitioned system for accounting for processor time consumed by operating system services provided on behalf of an application runs in a real-time environment. The time utilized by the operating system is treated as application processing time, rather than viewing the resultant processor time consumed as an operating system overhead. Each application consists of one or more threads. Time budget is assigned to each thread and to each interrupt. The processor time consumed by the operating system when executing on behalf of a thread or interrupt is charged back to the application or interrupt as part of the application's time budget. Operating system overheads and processor interrupts are thus accounted for accurately enough to determine a schedule for the applications that is enforceable by the operating system at run time.

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B. FIELDS SEARCHED				
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Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, IBM-TDB				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 01/20446 A (HONEYWELL INC) 22 March 2001 (2001-03-22) the whole document	1-38		
X A	US 5 386 561 A (HUYNH KHOA D ET AL) 31 January 1995 (1995-01-31) the whole document	1, 16, 35, 37 2-15, 17-34, 36, 38		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
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° Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
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Date of the actual completion of the international search <p style="text-align: center; font-weight: bold;">9 November 2004</p>	Date of mailing of the international search report <p style="text-align: center; font-weight: bold;">19/11/2004</p>			
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center; font-weight: bold;">Michel, T</p>			

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>ANDRE J-M ET AL: "OX: ADA CYCLIC EXECUTIVE FOR EMBEDDED APPLICATIONS" INTERNATIONAL SYMPOSIUM ON ON-BOARD REAL-TIME SOFTWARE ISOBRTS, XX, XX, January 1996 (1996-01), pages 241-245, XP001012597</p> <p>page 242, left-hand column, line 23 - right-hand column, line 18</p> <p>page 243, left-hand column, line 43 - page 244, right-hand column, line 19</p> <p style="text-align: center;">-----</p>	1-38
A	<p>ATLAS A ET AL: "Statistical Rate Monotonic Scheduling" PROCEEDINGS OF THE 19TH IEEE REAL-TIME SYSTEMS SYMPOSIUM. RTSS '98. MADRID, DEC. 2 - 4, 1998, IEEE REAL-TIME SYSTEMS SYMPOSIUM, LOS ALAMITOS, CA: IEEE COMPUTER SOC, US, 2 December 1998 (1998-12-02), pages 123-132, XP002144868</p> <p>ISBN: 0-7803-5243-2</p> <p>page 123, left-hand column, line 30 - right-hand column, line 6</p> <p>page 124, right-hand column, line 25 - line 36</p> <p>page 125, left-hand column, line 23 - page 126, left-hand column, line 30</p> <p style="text-align: center;">-----</p>	1-38

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No PCT/US 03/26215

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0120446	A	22-03-2001	US 2003154234 A1 14-08-2003
			AT 259514 T 15-02-2004
			BR 0014031 A 26-11-2002
			CA 2385786 A1 22-03-2001
			DE 60008267 D1 18-03-2004
			EP 1221094 A2 10-07-2002
			JP 2003509766 T 11-03-2003
			WO 0120446 A2 22-03-2001
			US 2002198925 A1 26-12-2002

US 5386561	A	31-01-1995	NONE
