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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

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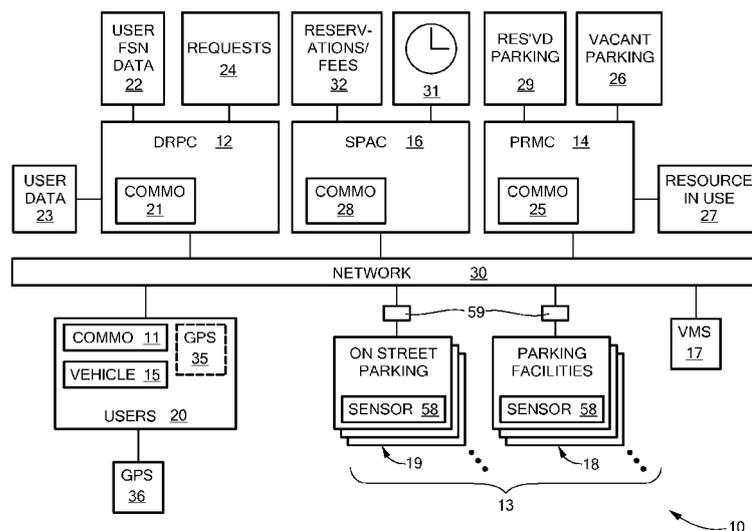
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR DYNAMIC PARKING ALLOCATION IN URBAN SETTINGS



**FIG. 1**

(57) Abstract: A "smart parking" system and method for an urban environment based on a dynamic resource allocation approach. The system assigns and reserves an optimal resource (parking space) for a discrete user based on the user's objective function that combines proximity to destination with parking cost, while also ensuring that the overall parking capacity is efficiently utilized. The solution of each Mixed Integer Linear Program (MILP) is an optimal allocation based on current state information and subject to random events such as new user requests or parking spaces becoming available.

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28 March 2013

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/045241****A. CLASSIFICATION OF SUBJECT MATTER*****B60W 30/06(2006.01)i, G08G 1/14(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B60W 30/06; B60Q 1/48; G08G 1/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords: parking, allocation, management, resource, discrete, user, preference, driver, request, process, smart, geographical, signal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 2006-106369 A1 (BARIC, KRESO et al.) 12 October 2006 See pages 3-5 and figure 1.	1-6,9 13
Y	US 7026954 B2 (SLEMMER, JOHN BLAKE et al.) 11 April 2006 See column 5 and figure 4.	13
A	US 2003-0112154 A1 (YOAKUM, JOHN H. et al.) 19 June 2003 See claim 1 and figure 1.	1-17
A	US 6750786 B1 (RACUNAS, ROBERT VINCENT) 15 June 2004 See abstract, columns 3,4 and figure 1.	1-17
A	WO 00-46068 A1 (HALL, BRETT) 10 August 2000 See abstract and figures 1-12.	1-17

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent 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 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

25 JANUARY 2013 (25.01.2013)

Date of mailing of the international search report

**28 JANUARY 2013 (28.01.2013)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan  
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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**INTERNATIONAL SEARCH REPORT**

International application No.

**PCT/US2012/045241****Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1-8 are directed to the parking allocation and management system.  
Claims 9-17 are directed to the method of optimally allocating and reserving parking resource.

The only common technical feature among claims 1-17 is the parking allocation and management system. However this feature lacks novelty or an inventive step with respect to the following document cited in ISR; WO 2006-106369 A1.  
Thus there is no technical relationship left over the prior art among the claimed inventions, leaving the claims without a single general inventive concept.  
Hence there is a lack of unity "a posteriori" (PCT Rules 13.1 and 13.2).

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/045241**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006-106369 A1	12.10.2006	HR 20050306 A2	28.02.2007
US 7026954 B2	11.04.2006	US 2004-0252034 A1 US 2006-0170566 A1 US 7135991 B2	16.12.2004 03.08.2006 14.11.2006
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WO 00-46068 A1	10.08.2000	AU 2000-27526 A1 AU 2000-27526 B2 AU 776448 B2 CA 2361583 A1 EP 1163129 A1 EP 1163129 A4 JP 2002-536739 A KR 10-0785137 B1 US 6340935 B1	25.08.2000 09.09.2004 09.09.2004 10.08.2000 19.12.2001 06.08.2003 29.10.2002 11.12.2007 22.01.2002