

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
2 October 2008 (02.10.2008)

PCT

(10) International Publication Number
WO 2008/118140 A3

- (51) **International Patent Classification:**
B64G 1/24 (2006.01) **G05D 1/08 (2006.01)**
B64B 1/26 (2006.01)
- (21) **International Application Number:**
PCT/US2007/022322
- (22) **International Filing Date:** 18 October 2007 (18.10.2007)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
Not furnished 6 November 2006 (06.11.2006) US
- (71) **Applicant (for all designated States except US):** **THE BOEING COMPANY** [US/US]; 100 North Riverside Plaza, Chicago, IL 60606-2016 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **ANZEL, Bernard, M.** [US/US]; 730 Bayonne Street, El Segundo, CA 90245 (US). **HO, Yiu-hung, M.** [US/US]; 1000 Via Fortuna, Palos Verdes Estates, CA 90274 (US).
- (74) **Agent:** **PLANK, Dennis, R.;** The Boeing Company, P.O. Box 2515, MC 110-SD54, Seal Beach, CA 90740-1515 (US).

- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

- (88) **Date of publication of the international search report:**
20 November 2008

(54) **Title:** METHODS AND APPARATUS FOR NODE-SYNCHRONOUS ECCENTRICITY CONTROL

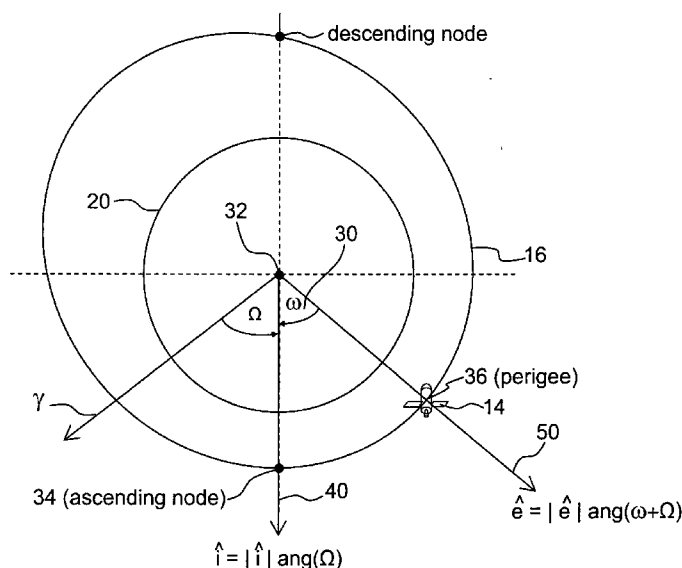


FIG. 2

(57) **Abstract:** A method for performing east-west station keeping for a satellite in an inclined synchronous (16) orbit is described. The method includes averaging a value of a right ascension of the ascending node (34) for an inclination vector (140) associated with the satellite over a period of the control cycle, and managing corrections for the satellite such that an eccentricity vector (150), directed at perigee (36), is substantially collinear with the inclination vector (140).

WO 2008/118140 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/022322

A CLASSIFICATION OF SUBJECT MATTER
INV. B64G1/24 B64G1/26 G05D1/08

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

B REIDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B64G G05D

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

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

EPO-Internal

C DOCUMENTS CONSIDERED TO BE RELEVANT

Category ¹	Citation of document with indication where appropriate of the relevant passages	Relevant to claim No
X	US 6 305 646 B1 (MCALLISTER JEOFFREY R [US] ET AL) 23 October 2001 (2001-10-23) column 6, line 51 - line 65 -----	1-22
A	EP 1 288 760 A (CENTRE NAT ETD SPATIALES [FR]) 5 March 2003 (2003-03-05) the whole document -----	1-22
A	US 5 669 585 A (CASTIEL DAVID [US] ET AL) 23 September 1997 (1997-09-23) column 6, line 41 - line 42 -----	1

D Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents

¹A" document defining the general state of the art which is not considered to be of particular relevance

¹E" 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)

¹O" document referring to an oral disclosure use exhibition or other means

¹P" document published prior to the international filing date but later than the priority date claimed

¹T" 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

¹X" 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

¹Y" 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

¹g" document member of the same patent family

Date of the actual completion of the international search

19 September 2008

Date of mailing of the international search report

30/09/2008

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

Sale, Yoann

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/022322

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6305646	B L	23-10-2001	NONE	
EP 1288760	A	05-03-2003	FR 2829247 A 1	07-03-2003
US 5669585	A	23-09-1997	US 6102335 A	15-08-2000
			US 5788187 A	04-08-1998