

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference <b>P201030354</b>	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. <b>PCT/ES2011/000011</b>	International filing date ( <i>day/month/year</i> ) <b>20 January 2011 (20.01.2011)</b>	Priority date ( <i>day/month/year</i> ) <b>11 March 2010 (11.03.2010)</b>	
International Patent Classification (8th edition unless older edition indicated) <b>See relevant information in Form PCT/ISA/237</b>			
Applicant <b>UNIVERSIDAD POLITÉCNICA DE MADRID</b>			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table border="0"> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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<p align="center">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p>	<p>Date of issuance of this report <b>11 September 2012 (11.09.2012)</b></p>
	<p>Authorized officer</p> <p align="center"><b>Simin Baharlou</b></p> <p>e-mail: pt09.pct@wipo.int</p>

PATENT COOPERATION TREATY

**TRANSLATION**

From the  
INTERNATIONAL SEARCHING AUTHORITY

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	<b>17.06.2011</b>
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Applicant's or agent's file reference <b>P201030354</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
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International application No. <b>PCT/ES2011/000011</b>	International filing date (day/month/year) <b>20.01.2011</b>	Priority date (day/month/year) <b>11.03.2010</b>
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International Patent Classification (IPC) or both national classification and IPC  
**B64G1/24 (2006.01)**

Applicant  
**UNIVERSIDAD POLITÉCNICA DE MADRID**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ES	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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Box No. I	Basis of this opinion
	<p>1. With regard to the <b>language</b>, this opinion has been established on the basis of:</p> <p><input checked="" type="checkbox"/> the international application in the language in which it was filed</p> <p><input type="checkbox"/> a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).</p> <p>2. <input type="checkbox"/> This opinion has been established taking into account the <b>rectification of an obvious mistake</b> authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))</p> <p>3. With regard to any <b>nucleotide and/or amino acid sequence</b> disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:</p> <p>a. (means)</p> <p><input type="checkbox"/> on paper</p> <p><input type="checkbox"/> in electronic form</p> <p>b. (time)</p> <p><input type="checkbox"/> in the international application as filed</p> <p><input type="checkbox"/> together with the international application in electronic form</p> <p><input type="checkbox"/> subsequently to this Authority for the purposes of search</p> <p>4. <input type="checkbox"/> In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.</p> <p>5. Additional comments:</p>

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International application No. PCT/ES2011/000011
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<b>Box No. V</b>	<b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>
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1. Statement			
Novelty (N)	Claims	1-13	YES
	Claims	_____	NO
Inventive step (IS)	Claims	1-13	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims	_____	NO

2. Citations and explanations:	
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D1 US 2007285304 A1 (COOPER GUY) 13 December 2007

D2 MURDOCH, N.; IZZO, D.; BOMBARDELLI, C.; HILGERS, A.; RODGERS, D.; CARNELLI, I.; Electrostatic tractor for near Earth object deflection; Proceedings of the 59th International Astronautics Conference, IAC2008, 2008.

Of all of the documents found in the prior art, D1 and D2 are considered to be the closest to the present application. The claims of the application are compared with these documents below.

**Claim 1**

D1 discloses a system for adjusting the position of a body (820) using a rocket (830) comprising:

- Means for emitting a stream of gas (830) to influence and push the body (820);
- A measurement module designed to use the information

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obtained with a radar (420) to estimate the mass of the body, the relative approach speed thereof or the rotation thereof.

- A control module, coupled to the measurement module, designed to activate and direct the stream of gas towards the body (820).

D2 describes a system for adjusting the position of a body, specifically an asteroid, using a guide satellite. In this case, to obtain the thrust required to deflect the asteroid, the system is based on the mutual interaction between an asteroid and a spacecraft overflying it. The interaction is the sum of the gravitational and electrostatic forces, given that a form of charge control is assumed on board the spacecraft and the asteroid is assumed to be charged to a given level. Thus, the type of force for pushing or pulling the asteroid will depend on the charge polarities. D2 states that the equilibrium potential reached by the spacecraft in space can be controlled by artificially emitting ions or electrons from the spacecraft.

Claim 1 of the application differs from D1 and D2 in that the system adjusts the position of a body using a guide satellite, comprising:

- Primary propulsion means that emit a stream of ions to influence and push the body;

- A measurement module designed to use the information obtained with a radar to estimate the mass of the body,

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the cross section of the body for the impact, the position and the relative distance of the body to the guide satellite;

- A control module, coupled to the measurement module, designed to activate and direct the primary means, as a function of the orientation and the relative distance to the body;

- The control module also being designed to activate secondary propulsion means of the guide satellite to direct and move said guide satellite; the secondary means being controlled as a function of the estimated mass of the body and the propulsion force generated by the primary means activated, such that the secondary means offset variations in the relative distance to keep it substantially constant.

The technical objective problem thus addressed in claim 1 is being able to adjust the position of a body by pushing it by emitting a stream of ions from propulsion means. None of the documents cited in the international search report, or any relevant combination thereof, discloses such an option. Consequently, claim 1 is novel, involves an inventive step and is industrially applicable (PCT Article 33(2) to (4)).

**Claims 2-13**

Dependent claims 2-13 are dependent on claim 1 and, consequently, are also novel, involve an inventive step and are industrially applicable (PCT Article 33(2) to

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

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