Abstract: The present disclosure features systems and methods for maintaining consistency of a CAD model across a plurality of homogeneous or heterogeneous applications across one or more computing devices and used by one or more users. The present disclosure features methods and systems for managing concurrent design of computer-aided design objects or models. The present disclosure is directed to systems and methods for managing concurrent design of computer-aided design objects or models.

Published:

— with international search report (Art. 21(3))

Date of publication of the international search report: 7 November 2013
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPCB: G06F 19/00 (2012.01)
USPC: 700/182

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

B. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2007/019230 A1 (WANG et al.) 23 August 2007 (23.08.2007) entire document, especially abstract: para (0037), (0042), (0044)-(0045), (0050), (0057)-(0059), (0072), (0086), (0090), (0099).</td>
<td>15-22</td>
</tr>
<tr>
<td>X</td>
<td>US 2010/0442676 A1 (SEROUSSI et al.) 18 February 2010 (18.02.2010) entire document, especially abstract: para (0070), (0149), (0204), (0206)-(0208), (0210), (0225), (0228), (0234), (0237)-(0243), (0246), (0247), (0249), (0251)-(0255), (0260).</td>
<td>33-77</td>
</tr>
<tr>
<td>A</td>
<td>US 2010/0223032 A1 (REGHETTI et al.) 02 September 2010 (02.09.2010), entire document.</td>
<td>1-77</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search: 27 April 2012 (27.04.2012)

Date of mailing of the international search report: 17 May 2012

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer: Lee W. Young
PCT Helpdesk: 571-272-3300
PCT OGP: 571-272-7774

Form PCT/ISA/2 10 (second sheet) (July 2009)
### 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).

### 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:

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 additional fees, this Authority did not invite payment of additional fees.**
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.**

Form PCT/ISA/2 10 (continuation of first sheet (2)) (July 2009)
Box III: Observations where unity of invention is lacking, continued:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-14, directed to synchronizing multiple items within a computer-aided design model at the various states within the life cycle of objects of the model.

Group II: Claims 15-32, directed to manage the multiple design steps involved in the evolving interrelated objects within a computer-aided design model.

Group III: Claims 33-77, directed to concurrently managing the multiple computer-aided design objects within a computer-aided design model.

The inventions listed as Groups I - III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of the Group I claims is managing synchronicity among the multiple items within the CAD model, over the various life cycle states of its objects.

The special technical feature of the Group II claims is managing the multiplicity of steps over the evolution of interrelated objects within the CAD model.

The special technical feature of the Group III claims is managing concurrency among the various objects comprising the CAD model.

None of these special technical features is common to the other groups, nor do they correspond to a special technical feature in the other groups. Therefore, unity of invention is lacking.