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To the Director of the U.S. Patent and Trademark Office, documents or the new address(es) below.

1. Name of conveying party(ies)

Tian-Bing Xu

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

3. Nature of conveyance/Execution Date(s):

Execution Date(s) October 9, 2009

- ☒ Assignment ☐ Merger
☐ Security Agreement ☐ Change of Name
☐ Joint Research Agreement
☐ Government Interest Assignment
☐ Executive Order 9424, Confirmatory License
☐ Other _____

2. Name and address of receiving party(ies)

Name: National Institute of Aerospace Associates

Internal Address: _____

Street Address: 100 Exploration Way

City: Hampton

State: Virginia

Country: USA Zip 23666-6147

Additional name(s) & address(es) attached? ☐ Yes ☒ No

4. Application or patent number(s):

☐ This document is being filed together with a new application.

A. Patent Application No.(s)

B. Patent No.(s)

12/584,290

Additional numbers attached? ☐ Yes ☒ No

5. Name and address to whom correspondence concerning document should be mailed:

Name: Kelly Brown c/o Kaufman & Canoles

Internal Address: P.O. Box 3037

Street Address: 150 West Main Street

City: Norfolk

State: VA Zip 23514-3037

Phone Number: 757-624-3212

Fax Number: 757-624-3169

Email Address: trademarks@kaufcan.com

6. Total number of applications and patents involved: 1

7. Total fee (37 CFR 1.21(h) & 3.41) \$40.00

- ☐ Authorized to be charged to deposit account
☐ Enclosed
☐ None required (government interest not affecting title)

8. Payment Information

10/15/2009 DBYRNE 00000002 12584290

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Authorized User Name _____

9. Signature:

Kimberly A. Chasteen
Signature

Kimberly A. Chasteen, Reg. No. 36755

Name of Person Signing

10/15/2009 DBYRNE 00000001 12584290

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Date

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Total number of pages including cover sheet, attachments, and documents:

3

Documents to be recorded (including cover sheet) should be faxed to (571) 273-0140, or mailed to:
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

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PATENT

REEL: 023382 FRAME: 0624

ASSIGNMENT OF INVENTION AND PATENT RIGHTS

I, Tian-Bing Xu residing at 6 Clydesdale Court, Hampton, VA 23666, claim and declare that I am a true, first inventor of an invention (the "Invention") as more fully described in a provisional patent application Serial No. 61/093,767 entitled SUPER PERFORMANCE FULL PIEZOELECTRIC MULTILAYER-STACKED HYBRID ACTUATION/TRANSDUCTION SYSTEMS (STACKED-HYBATS) filed in the United States Patent and Trademark office (the "USPTO") on September 3, 2008, with regard to the Invention, and a corresponding U.S. non-provisional patent application Serial No. 12/584,290 entitled PIEZOELECTRIC MULTILAYER-STACKED HYBRID ACTUATION/TRANSDUCTION SYSTEM filed in the USPTO on September 3, 2009 (the "Applications"); and for and in consideration of good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, do hereby:

1. Assign, sell, transfer and convey unto the NATIONAL INSTITUTE OF AEROSPACE ASSOCIATES, a Virginia corporation with its office at 100 EXPLORATION WAY, HAMPTON, VIRGINIA 23666-6147 ("Assignee"), its successors and assigns, the full and exclusive right to the Invention in the United States and all of my right, title and interest throughout the world in and to (a) the Applications and the Invention; (b) all provisional and non-provisional patent applications other than the Applications that may hereafter be filed in the USPTO, and all patent applications that may hereafter be filed under the Patent Cooperation Treaty or any other international treaty or convention or in any country, claiming rights in or to the Invention or based on or claiming priority to either of the Applications; (c) all Letters Patent of the United States or any foreign country which may be issued or granted with respect to the Invention or as a result of any of the Applications or such other patent applications (the "Invention Patents"); and (d) all reissues, reexaminations, divisionals, continuations, continuations-in-part, renewals, substitutions or extensions of or for any of the foregoing;

2. Authorize and request the appropriate governmental officials to issue any and all Invention Patents to Assignee, as the assignee of my entire right, title and interest in and to the same to the full end of the terms for which said Patents may be granted, as fully and entirely as the same would have been held by me had this assignment and sale not been made;

3. Consent to the recordal of this Assignment and, being under covenant, declare, represent and warrant that I have full power to make same, that I have not executed and will not execute any instrument or assignment in conflict herewith, and that my rights assigned hereby are not otherwise encumbered by any grant, license, or other right heretofore given to any other party;

4. Covenant and agree that I will, at any time upon request of Assignee, its successors or assigns, make, execute and deliver any and all other instruments in writing, including further applications, papers, affidavits, powers of attorney, assignments and other documents, and do all lawful acts and things which may in any country or in connection with any patent application be required, necessary or advisable more effectively to secure and vest in Assignee, its successors and assigns my entire right, title and interest in and to the Invention, the Applications, other patent applications claiming rights in or to the Invention or based on or

claiming priority to either of the Applications, the Invention Patents, and other rights hereby assigned, transferred and conveyed, and that upon request I will sign any applications for reissue, reexamination, division, continuation, continuation-in-part, renewal, substitution or extension of or for any applications for Invention Patents; and

5. Covenant and agree that I will at any time upon request of Assignee communicate to Assignee, its successors, assigns or other legal representatives, any facts relating to the Invention known to me, and will testify as to the same in any interference, litigation, mediation, arbitration or other proceeding when requested to do so by Assignee.

The aforesaid Assignment includes the right in and to all income, royalties, damages and payments now or hereafter due or payable with respect to any of the Invention Patents, and in and to any causes of action (either in law or in equity) and the right to sue, counterclaim, and or recover for past, present and future infringement of the Invention Patents, as fully and entirely as the same would have been held and enjoyed by me if this Assignment had not been made.

Subscribed and sworn to by me at Hampton, Virginia this 9th day of October, 2009.



Tian-Bing Xu

City County of Hampton
Commonwealth of Virginia

The foregoing instrument was acknowledged before me this 9 day of OCT, 2009 by Tian-Bing Xu



Notary Public

Notary Registration Number: 327353

My Commission Expires: 9/30/2011

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