

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY)		2. REPORT TYPE Technical Papers		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER 2306	
				5e. TASK NUMBER M103	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Research Laboratory (AFMC) AFRL/PRS 5 Pollux Drive Edwards AFB CA 93524-7048				8. PERFORMING ORGANIZATION REPORT	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Air Force Research Laboratory (AFMC) AFRL/PRS 5 Pollux Drive Edwards AFB CA 93524-7048				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT A	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Leilani Richardson
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code) (661) 275-5015

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6 separate items are enclosed.

MEMORANDUM FOR PR (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO)

26 Jun 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: AFRL-PR-ED-AB-2000-142
P. Wapner (ERC); W. Hoffman, "Microsensors that Function on the Basis of Surface and Wettability"
(Abstract)

**Fall Meeting of Materials Research Society
(Boston, MA, 03 Dec 2000)**

(Statement A)

(Submission Deadline: 10 Jul 2000)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

Comments: _____

Signature _____ Date _____

2. This request has been reviewed by the Public Affairs Office for: a.) appropriateness for public release and/or b) possible higher headquarters review.

Comments: _____

Signature _____ Date _____

3. This request has been reviewed by the STINFO for: a.) changes if approved as amended, b.) appropriateness of distribution statement, c.) military/national critical technology, d.) economic sensitivity, e.) parallel review completed if required, and f.) format and completion of meeting clearance form if required

Comments: _____

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4. This request has been reviewed by PR for: a.) technical accuracy, b.) appropriateness for audience, c.) appropriateness of distribution statement, d.) technical sensitivity and economic sensitivity, e.) military/national critical technology, and f.) data rights and patentability

Comments: _____

APPROVED/APPROVED AS AMENDED/DISAPPROVED

PHILIP A. KESSEL Date
Technical Advisor
Propulsion Science and Advanced Concepts Division

20021119 091

MICROSENSORS THAT FUNCTION ON THE BASIS OF SURFACE TENSION AND WETTABILITY

The displacement of non-wetting fluid droplets contained within capillaries that have axial profiles ^{and} that are non-uniform can be used to accurately and ~~reproducibility~~ ^{reproducibility} measure the forces ^{needs different word - this no doesn't make sense} acting upon these droplets. The position of droplets within such micro-sensors is dictated by surface tension, wettability, geometric configuration of the confining walls, and the forces acting upon the droplet. These micro-sensors can measure pressure and acceleration, and can also be made to operate as micro-valves, micro-switches, optical shutters, as well as other devices. They have no moving mechanical parts to wear out, and can theoretically endure high amounts of over-actuation and still return to initial levels of accuracy and precision without harm. The axial profiles of these shaped capillaries are easily fabricated using microtube technology developed at the Air Force Research Laboratory at Edwards Air Force Base. However, it is also possible to use non-circular shaped voids and still achieve similar capabilities with some limitations. These non-circular shaped voids can be manufactured using more conventional MEMS technologies such as photolithography and LIGA.