

AD-A208 886

CRANFIELD INSTITUTE OF TECHNOLOGY

RADIAL INFLOW TURBINE STUDY

FIRST INTERIM REPORT

by

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APRIL 1989

United States Army
EUROPEAN RESEARCH OFFICE OF THE U.S. ARMY
London England

CONTRACT NUMBER: DAJA45-89-C-0006
CRANFIELD REFERENCE: 06/769E

PROJECT START DATE: 1st January 1989
PROJECT COMPLETION DATE: 31st December 1992

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JUN 07 1989
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UNCLASSIFIED

DAJA45-89-C-0006
ATTACHMENT #1

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Distribution unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) 06/769E(1)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION Cranfield Institute of Technology		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION European Research Office		
6c. ADDRESS (City, State, and ZIP Code) Cranfield, Bedford, MK43 OAL.			7b. ADDRESS (City, State, and ZIP Code) 223 Old Marylebone, London, NW1 5TH.		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION USACE - RCO Burtonwood		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER R D 5824-AN-01		
8c. ADDRESS (City, State, and ZIP Code) HQ 47th Area Support Group, Burtonwood Road, Great Sankey, Warrington, Cheshire, WA5 1UN.			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) Radial Inflow Turbine Study					
12. PERSONAL AUTHOR(S) Dr. C.P. Forster, Prof. R.L. Elder					
13a. TYPE OF REPORT INTERIM		13b. TIME COVERED FROM 1.1.89 TO 28.2.89		14. DATE OF REPORT (Year, Month, Day) 1989, April	
				15. PAGE COUNT 3	
16. SUPPLEMENTARY NOTATION R7-3.21/IH					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
			Radial Turbines, Laser Anemometry - JES		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
The radial inflow turbine is a major component used in both small gas turbines and turbochargers. Its performance is important to the success of these systems yet the detailed aerodynamics are still largely ill-defined especially in small high speed units where small passages and high velocities are involved. The problems are also often aggravated due to the requirement of larger than optimum flow rates to provide units with a maximum power to weight (or size) ratio. Cranfield, the US Army and Turbomach (San Diego) have instigated a program of work in which the flow processes within a small high speed radial inflow turbine are to be investigated both experimentally and theoretically. The objective of these studies is to provide a better basic understanding of the flow processes involved which will in time provide a good basis for the design of improved components. The strategy will be to use laser anemometry to probe particularly complex regions of the flow where either losses occur PTO					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL			22b. TELEPHONE (Include Area Code)		22c. OFFICE SYMBOL

DD Form 1473, JUN 86

Previous editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

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or the definition of conditions is critical to performance. It is understood that computational studies are to be initiated by the Research Office which will compliment these studies.

Cranfield have been contracted by ERO to perform a study of a Radial Inflow Turbine unit, this unit to be provided by Turbomach of San Diego. The study is of three years duration and started 1st January, 1989.

This document forms the first progress report describing work undertaken from 1st January to 28th February, inclusive.

The work undertaken in this period has largely been concerned with negotiations with Turbomach on the terms of loan (Bailment and Confidentiality Agreement) of the rig, drawing details and the procurement (by Turbomach) of an export licence to cover the material temporarily exported to the UK under this project. These matters have now been successfully undertaken together with the preliminary design scheme required. The immediate task now involves the detailed design of rig modifications and installation. Technical collaboration with Turbomach (liaison is through Maurice Bull) is good and an interesting project is now underway.

No matters have occurred which affect the overall scope of the project and it is confidently expected that the first (and following) year's objectives will be achieved.

Amount of unused funds at the end of this period: \$175,218.

Property acquired during this period: None



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R7-3.21/IH