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CHEMICAL RESEARCH, DEVELOPMENT & ENGINEERING CENTER

CRDEC-SP-014

1989 ADVANCED PLANNING BRIEFING FOR INDUSTRY (APBI)

Compiled by Ronald P. Hinkle

ADVANCED SYSTEMS CONCEPTS DIRECTORATE

October 1989

U.S. ARMY ARMAMENT MUNITIONS CHEMICAL COMMAND

Aberdeen Proving Ground, Maryland 21010-5423

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REPORT DOCUMENTATION PAGE

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16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	NBC contamination survivability Chemical defense Decontamination, Smoke/Obscuration (continued on reverse)
15	02		

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This publication is a compilation of the planned agenda and copies of the vugraphs to be presented at the 1989 Advanced Planning Briefing for Industry (APBI). The APBI is being held at the U.S. Army Chemical Research, Development and Engineering Center (CRDEC), Edgewood Area, Aberdeen Proving Ground, Maryland, on 17 and 19 October 1989. This briefing will cover specific aspects of the CRDEC programs and provide industry with mission-oriented scientific and technical information.

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22a. NAME OF RESPONSIBLE INDIVIDUAL SANDRA J. JOHNSON	22b. TELEPHONE (Include Area Code) (301) 671-2914 / 22c. OFFICE SYMBOL SMCCR-SPS-T

DD Form 1473, JUN 86 *Previous editions are obsolete.*

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18. SUBJECT TERMS (continued)

Reconnaissance, detection and identification
Collective protection
Individual protection
Aerosol science
Flame weapons

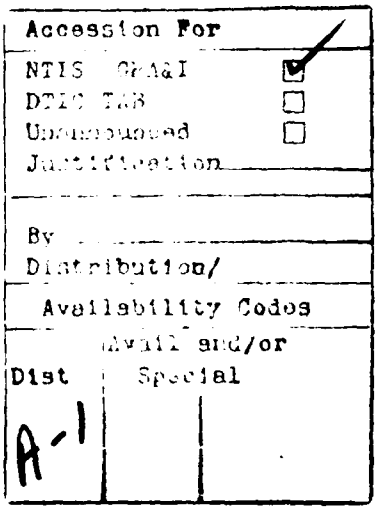
PREFACE

The use of trade names or manufacturers' names in this report does not constitute an official endorsement of any commercial products. This report may not be cited for purposes of advertisement.

This report has been approved for release to the public.

Acknowledgments

The authors thank Ralph Falcone, Chief of Visual Information Division, Management Information Systems Directorate, and his staff for preparing the presentation vugraphs.



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CONTENTS

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1989 ADVANCED PLANNING BRIEFING FOR INDUSTRY (APBI)

1. INTRODUCTION

A professional, active extramural relations program is a necessary part of the U.S. Army's Research and Development (R&D) Program if the U.S. Army is to take maximum advantage of the rapidly expanding science and technology in the private sector. The U.S. Army recognizes that industry's and academia's access to advanced planning and requirements information as well as advice and guidance on doing business with the U.S. Army increases the effectiveness of bids and proposals, fosters competition, helps to surface scientific and technical developments, and increases the productivity of independent R&D, all of which ultimately return to the U.S. Army in the form of enhanced strength and effectiveness as a fighting force. It is therefore incumbent upon the U.S. Army Chemical Research, Development and Engineering Center (CRDEC) to make available the latest program information.

Current policy requires that every major subordinate command of the U.S. Army Materiel Command sponsor an APBI for each of its research, development, test, and evaluation (RDTE) projects. An APBI includes details on mid- and long-range RDTE plans and programs; background information on current related U.S. Army programs; and details on threat, deficiencies, and doctrine. APBIs are announced in the Commerce Business Daily. Direct invitations are sent to organizations on the CRDEC mailing list.

On 17 and 19 October 1989, CRDEC will conduct its eighth industry meeting for the purpose of detailing out-of-house opportunities for contractors with interest and expertise in chemical defense and smoke/obscuration related technologies.

The intent of the meeting is to provide specific opportunities to consider in the area of competitive procurements and innovative ideas qualifying for unsolicited proposals and collaborative R&D efforts. The tone of the meeting is to be that of integrity and openness on the part of CRDEC. That tone is expected to be reciprocated by the attendees from industry and academia.

A good cross-section of the research, development, and acquisition community are expected at this APBI. Based on APBIs conducted over the past 8 years by CRDEC, representatives from prime defense contractors, nonprofit institutions, small businesses, universities, subcontrators, parts suppliers, and consultants will attend.

CRDEC encourages participants in the 1989 APBI to contact the Technical Industrial Liaison Office (301-671-2031) with any administrative questions or suggestions to provide a better APBI next year.

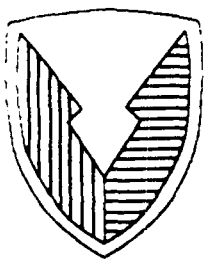
2. AGENDA AND PRESENTATIONS

The planned agenda and copies of vugraphs to be briefed follow.

PROPOSED AGENDA
U.S. ARMY CHEMICAL RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
ADVANCED PLANNING BRIEFING FOR INDUSTRY
17 and 19 October 1989

0810	Administrative Remarks	Mr. R. Hinkle
0815	Welcome	COL R. Gross
0820	Overview of CRDEC	Mr. J. Vervier
0850	Future Army Requirements	COL I. Licata U.S. Army Chemical School
0945	Research Programs:	
	Aerosol Science	Dr. E. Stuebing
	Spectroscopy of CB Materials	Dr. R. Long
1015	BREAK	
1030	Individual Protection	Mr. R. Brletich
1100	Collective Protection	Mr. J. Mok/Mr. R. Puhala*
1130	Decontamination Systems	Mr. R. Bucci/Dr. J. Baker*
1200	LUNCH	
1300	NBC Contamination Survivability of Army Materiel	Dr. W. Magee
1320	Standoff and Point Detection	Dr. R. Mackay
1335	Multipurpose Integrated Chemical Agent Detector (MICAD)	Mr. J. Szachta
1350	Smoke Systems	Mr. J. Weinand
1420	Flame and Incendiary Weapons	1LT G. Scaven
1435	BREAK	
1450	Requirements for Fielded Items	Ms. D. Jukulen AMCCOM Procurement
1550	Mission Support Contracts	Mr. J. Carielli
1605	Value Engineering Opportunities	Mr. F. Kohut
1610	Industrial Liaison Programs	Mr. R. Hinkle
1620	Closing Remarks	

*Presenters who will speak on October 19.



U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

OVERVIEW OF CRDEC

by

MR. J. VERVIER
Technical Director

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AO332-C-C9-224952

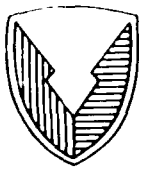
CURRENT DOD POLICY

CHEMICAL WARFARE/CHEMICAL-BIOLOGICAL DEFENSE PROGRAM

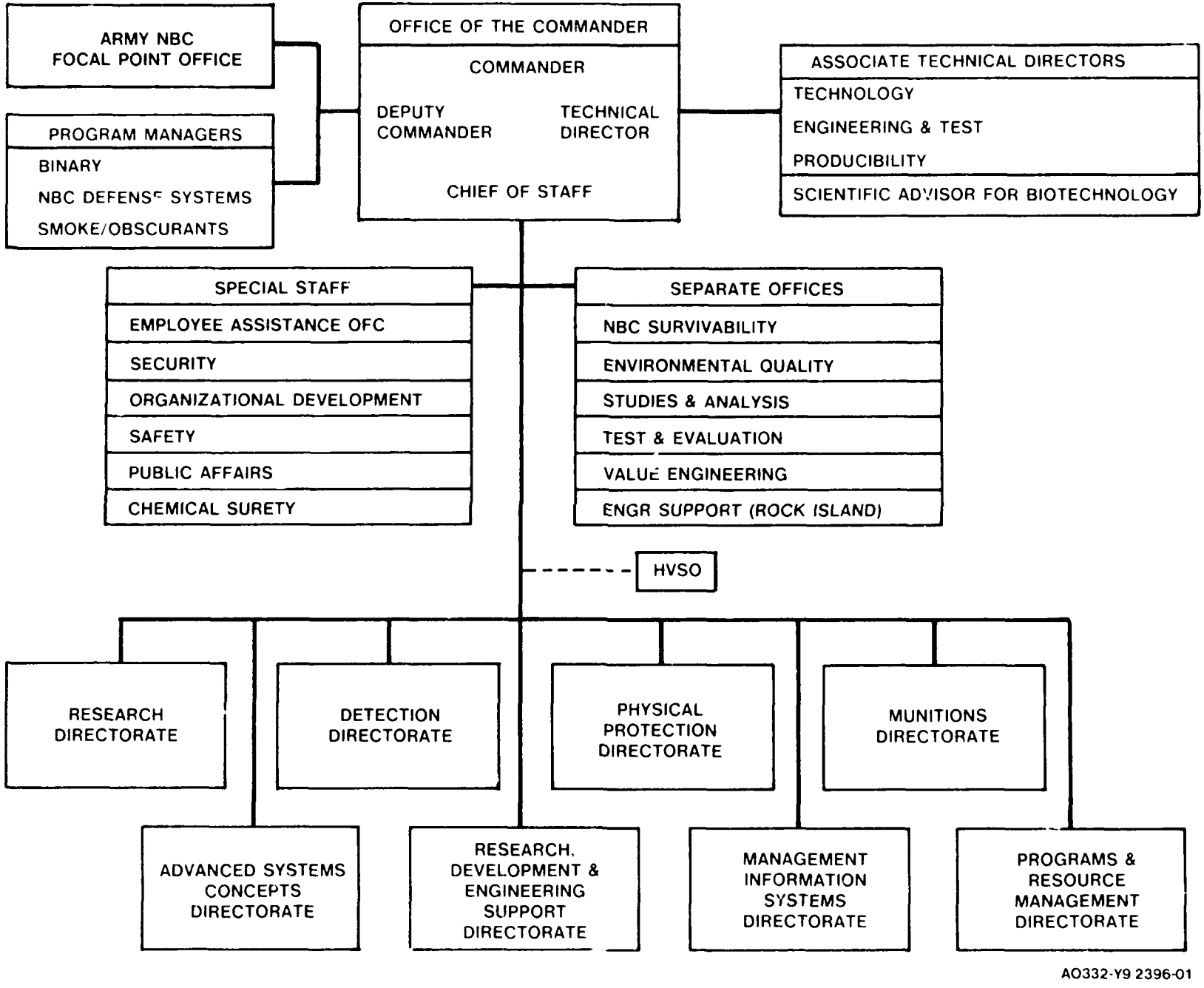
. . . TO PREVENT THE USE OF CHEMICALS, TOXINS AND BIOLOGICAL AGENTS AGAINST THE MEMBERS OF THE U.S. ARMED FORCES

- NO FIRST USE OF CHEMICAL WEAPONS
- NO USE OR POSSESSION OF BIOLOGICAL OR TOXIN WEAPONS
- MAINTAIN DETERRENT/RETALIATORY CHEMICAL WARFARE CAPABILITY
- MAINTAIN ADEQUATE DEFENSIVE POSTURE FOR CHEMICAL/ BIOLOGICAL WARFARE

CRDEC MISSION



- RESEARCH, DEVELOPMENT AND ACQUISITION FOR . . .
  - CHEMICAL/BIOLOGICAL DEFENSIVE MATERIEL
  - RETALIATORY CHEMICAL MUNITIONS
  - SMOKE/OBSCURANT SYSTEMS
- LIFE CYCLE ENGINEERING SUPPORT OF ASSIGNED ITEMS
- U.S. LEAD LABORATORY FOR INTERNATIONAL RESEARCH, DEVELOPMENT AND STANDARDIZATION
- JOINT SERVICE R&D SUPPORT



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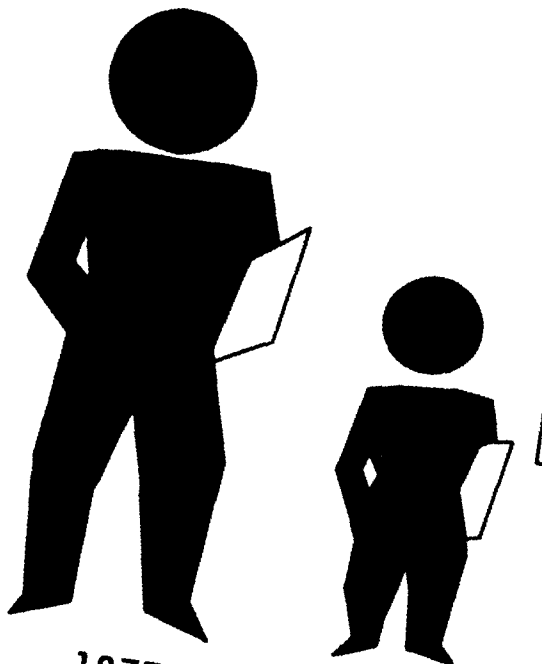
RESOURCES - PEOPLE



1377
TOTAL
1285 CIVILIAN
AND
92 MILITARY

657
SCIENTISTS
AND
ENGINEERS

546 BS
146 MS
76 PhD

137 CHEMISTS
140 CHEMICAL ENGINEERS
78 PHYSICAL SCIENTISTS
90 MECHANICAL ENGINEERS
75 GENERAL ENGINEERS
22 PHYSICISTS
20 BIOLOGISTS

15 OPERATION RESEARCH
14 MATHEMATICIANS
23 ELECTRICAL ENGINEERS
3 PHYSIOLOGISTS
6 INDUSTRIAL ENGINEERS
4 PHARMACOLOGISTS

- AVERAGE AGE – 41
- 116 EXTRAMURAL STAFF ON SITE

AO332-09 1748-01

CHEMICAL RESEARCH, DEVELOPMENT & ENGINEERING CENTER

PROGRAM AREAS

DEFENSE

- RECONNAISSANCE, DETECTION AND IDENTIFICATION
- INDIVIDUAL PROTECTION
- COLLECTIVE PROTECTION
- DECONTAMINATION

WARFIGHTING

- WEAPONS
- SMOKE/OBSCURANTS

SUPPORTING TECHNOLOGIES

- DATA COLLECTION/SYSTEMS SCIENCE
- THREAT AGENT CHEMISTRY
- INTEGRATION/ANALYSIS

RESPONSE PROGRAMS

- CB ANTITERRORISM
- TREATY VERIFICATION

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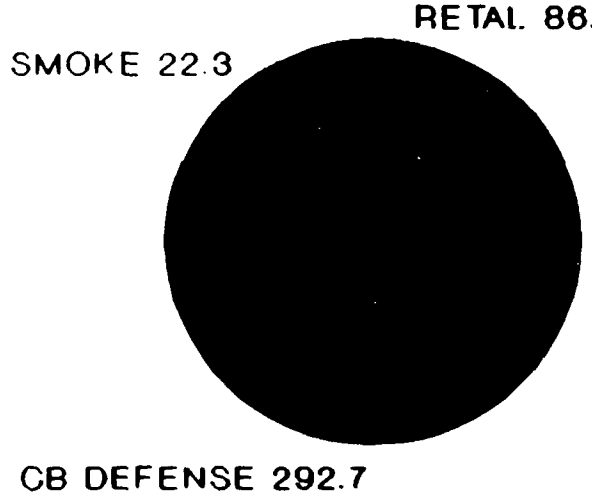
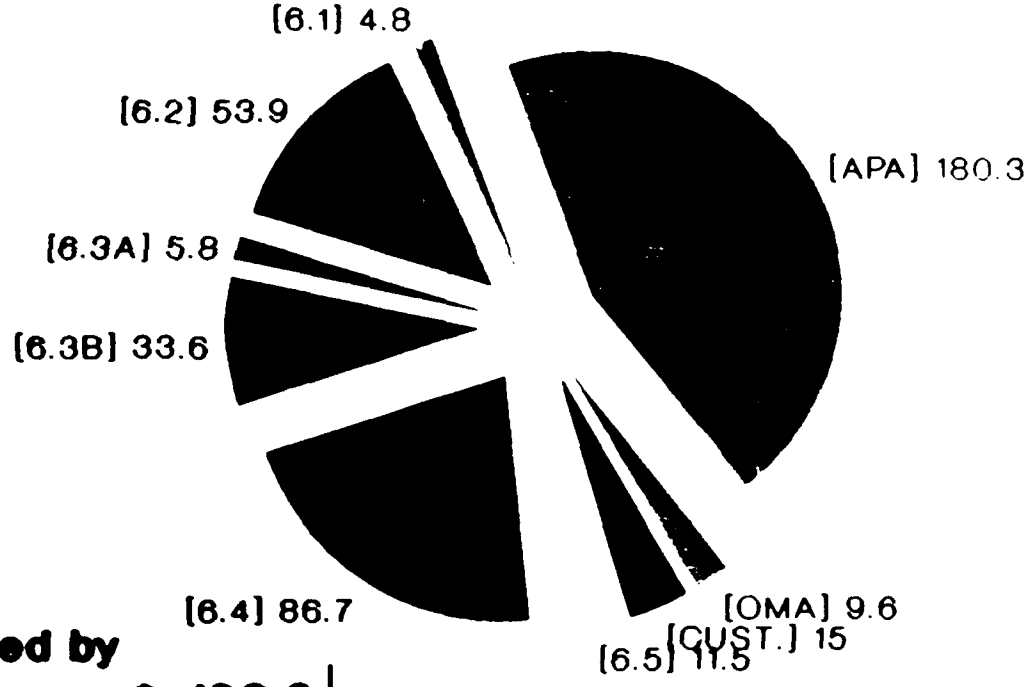
CHEMICAL PROFILE
FY90 PROGRAM
TOTAL PROGRAM $401

RESOURCES



ALLOCATION



RDTE	$	211.3
APA	$	180.3
OMA	$	9.6

→ **Accomplished by**

IN-HOUSE	$	100.0
CONTRACT	$	261.2
OGA	$	40.0

Includes CRDEC PM BINARY, PM SMOKE, and PM NBC

31 AUG '89

RDTE NBC MISSION AREA

FY90 PROGRAM RESOURCE ALLOCATION

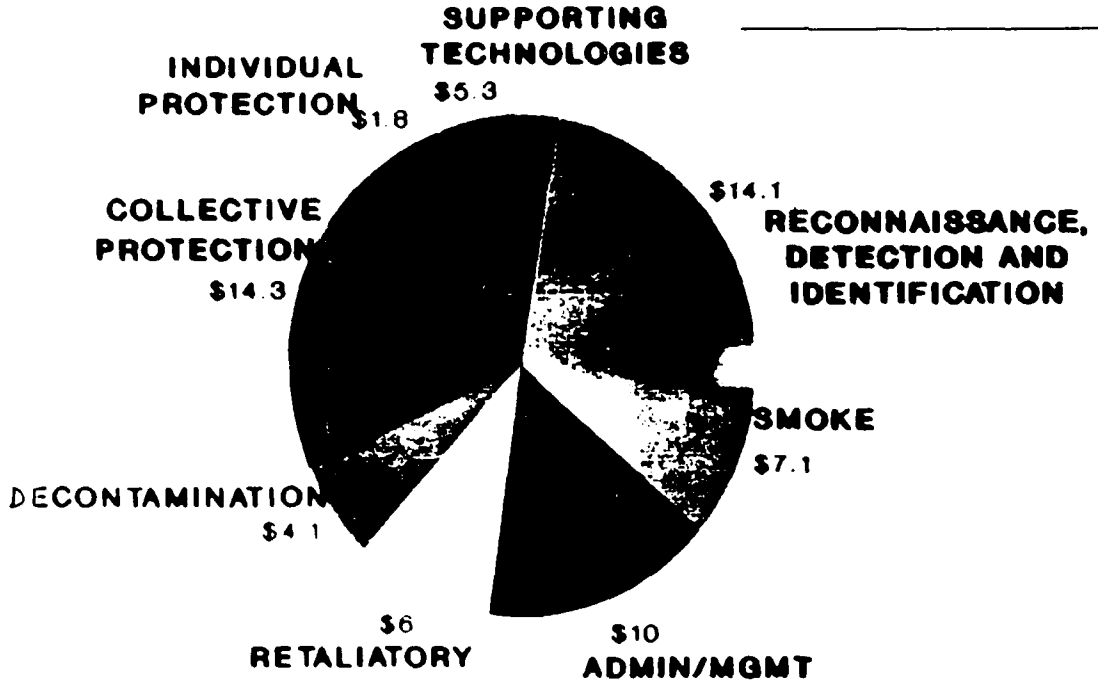
($MILLIONS) Source: POE/POM SYSTEM 8/23/89

	6.1	6.2	6.3A	6.3B	6.4	TOTAL	%
THREAT AGENT CHEMISTRY		1.1				1.1	.6
INTEGRATION/ANALYSIS		1.4				1.4	.8
NBC RECON/DET/IDENT	1.2	10.3	2.6	9.4	34.8	58.3	31.9
INDIVIDUAL PROTECTION	.2	1.6			1.9	3.7	2.0
COLLECTIVE PROTECTION	.3	14.0		1.0	1.6	16.9	9.2
DECONTAMINATION	.7	2.0	1.4	11.7	1.8	17.6	9.6
ANTITERRORISM		.2				.2	.1
RETALIATORY MUNITIONS	.9	5.1		3.7	35.5	45.2	24.7
SMOKE/OBSC - EQUIP DEFEAT	1.5	5.6		7.8	11.1	26.0	14.2
CB SIM, SURV & SYS SCIENCE		2.6				2.6	1.4
ADM & MGT		10.0				10.0	5.5
CLASSIFIED			*1.8				
TOTAL	4.8	53.9	4.0	33.6	86.7	183.0	100.0

*NOT INCLUDED IN TOTALS

CRDEC TECH BASE FUNDING
($M)

TOTAL FY90 PROGRAM: $62.7



SUPPORTING TECHNOLOGIES

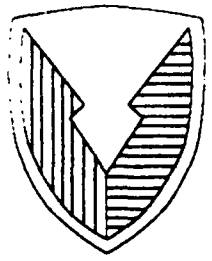
- THREAT AGENT CHEMISTRY AND EFFECTS
- ANALYSIS AND INTEGRATION OF CHEMICAL DEFENSE SYSTEMS
- CB MODELING
- CB SIMULANTS, SURVIVABILITY AND SYSTEMS SCIENCE

AUG '89

CRDEC THRUSTS

PROVIDE ARMED FORCES WITH RESPONSIVE CBD/CW SYSTEMS

- EXPLOIT THE WORLDWIDE TECHNOLOGY BASE TO ACHIEVE SIGNIFICANT MATERIEL ADVANCES
- ADOPT A MATERIEL ACQUISITION STRATEGY WHICH FEATURES EARLY PLANNING AND ANALYSIS AND FIELDS INTEGRATED FAMILIES OF MATERIEL WHICH ARE READILY ADAPTABLE TO IMPROVEMENT AS TECHNOLOGY IMPROVES
- IMPLEMENT A COHERENT LONG RANGE PLAN TO ACHIEVE AND MAINTAIN MATERIEL SUPERIORITY
- MAXIMIZE WORKFORCE AND ORGANIZATIONAL EFFECTIVENESS
- BE AND BE PERCEIVED AS THE CENTER OF EXCELLENCE IN CBD/CW SCIENCE, TECHNOLOGY AND MATERIEL



U.S. ARMY
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AEROSOL SCIENCE

by

DR. E. STUEBING
RESEARCH DIRECTORATE

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AO332-C-C9-224953

AEROSOL SCIENCE RESEARCH

APBI TOPICS

- INVERSION OF POLARIZED LIGHT SCATTERING FROM SINGLE AEROSOL PARTICLES TO CHARACTERIZE SIZE, SHAPE, OR COMPOSITION

- HANDLING AND ANALYSIS OF SINGLE AEROSOL PARTICLES (1 – 100 μm DIAMETER)

A0332-X9 2331-01

AEROSOL SCIENCE RESEARCH

6.1 CONTRACT POTENTIAL

- FEW CONTRACTS (1 – 2)
- VALUE $ 30 K – $ 60 K
- INDEPENDENT RESEARCH AND DEVELOPMENT (IR&D) ALERT TO POSITION FOR POSSIBLE FUTURE 6.2 CONTRACTS
- SBIR PROPOSALS WELCOME
  - FY90 – SINGLE PARTICLE MULTIANALYSIS CHAMBER
  - FUTURE – AS AUTHORIZED BY DOD ANNOUNCEMENT

POTENTIAL APPLICATION AREAS

- **DETECTION**

  Biologicals
  Microencapsulated

- **SMOKE PARTICLE CHARACTERIZATION**

  Manufacture Process Control
  Field Test Characterization

- **TREATY VERIFICATION**

  Miniscule Samples
  Highly Dilute Mixtures

- **FILTRATION EFFECTIVENESS**

  Penetration/Effluent Monitor
  Catalytic Destruction Monitor

AEROSOL SCIENCE RESEARCH

APBI TOPICS

INVERSION OF POLARIZED LIGHT SCATTERING FROM SINGLE AEROSOL PARTICLES TO CHARACTERIZE:

- SIZE (0.1 – 50 μm)
- SHAPE (FIBER, FLAKE, ISOMETRIC, SPHERE)
- COMPOSITION (REFRACTIVE INDEX, LAYERS, BIOLOGICAL IDENTITY)

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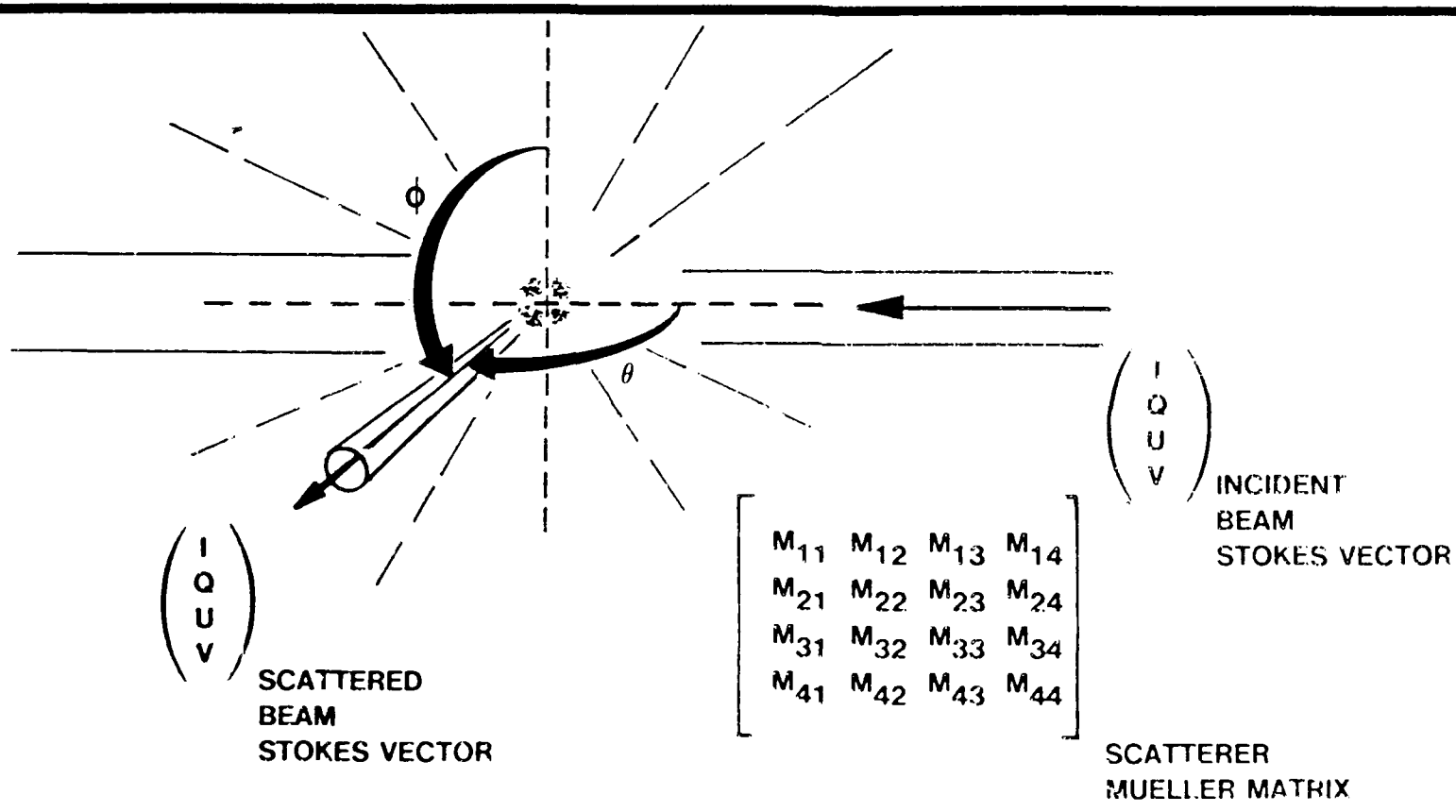
STOKES — MUELLER LIGHT SCATTERING



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MUELLER MATRIX ELEMENTS

$M_{11}(r,\Phi)$	$M_{12}(r,\Phi)$	$M_{13}(r,\Phi)$	$M_{14}(r,\Theta)$
$M_{21}(r,\Theta)$	$M_{22}(r,\Theta)$	$M_{23}(r,\Theta)$	$M_{24}(r,\Theta)$
$M_{31}(r,\Theta)$	$M_{32}(r,\Theta)$	$M_{33}(r,\Phi)$	$M_{34}(r,\Phi)$
$M_{41}(r,\Phi)$	$M_{42}(r,\Theta)$	$M_{43}(r,\Phi)$	$M_{44}(r,\Phi)$

SCATTERING INTENSITY WITHOUT REGARD TO POLARIZATION

CLASSICAL ELLIPSOMETRY

CIRCULAR INTENSITY DIFFERENTIAL SCATTERING (CIDS)

THESE ELEMENTS VANISH FOR UNIFORM SPHERES

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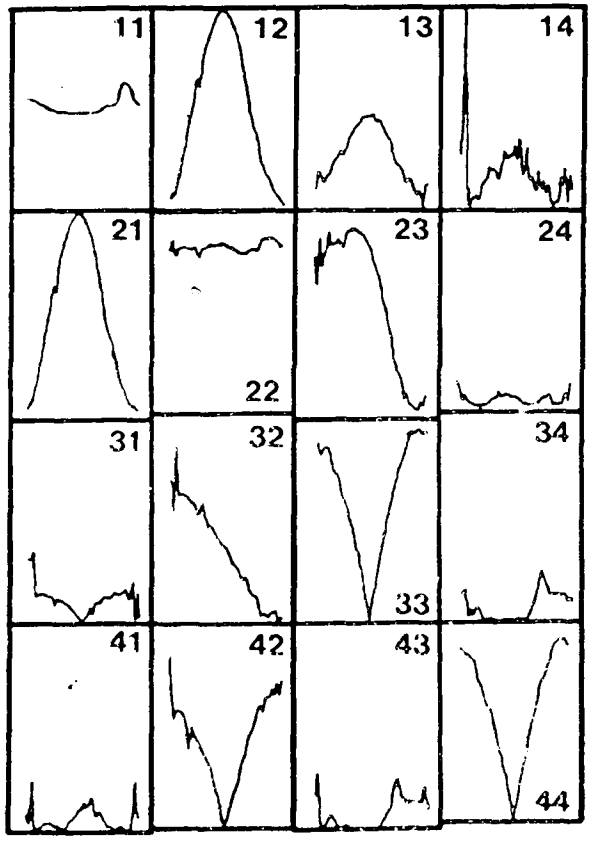
MUELLER MATRIX MEASUREMENTS



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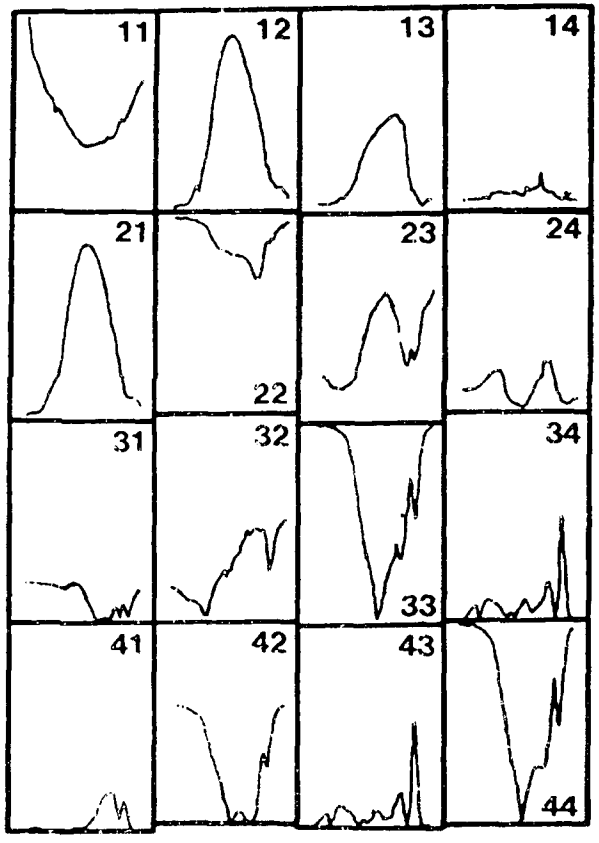

E. COLI

HORIZONTAL 0° TO 180°
VERTICAL 0 TO ± 1

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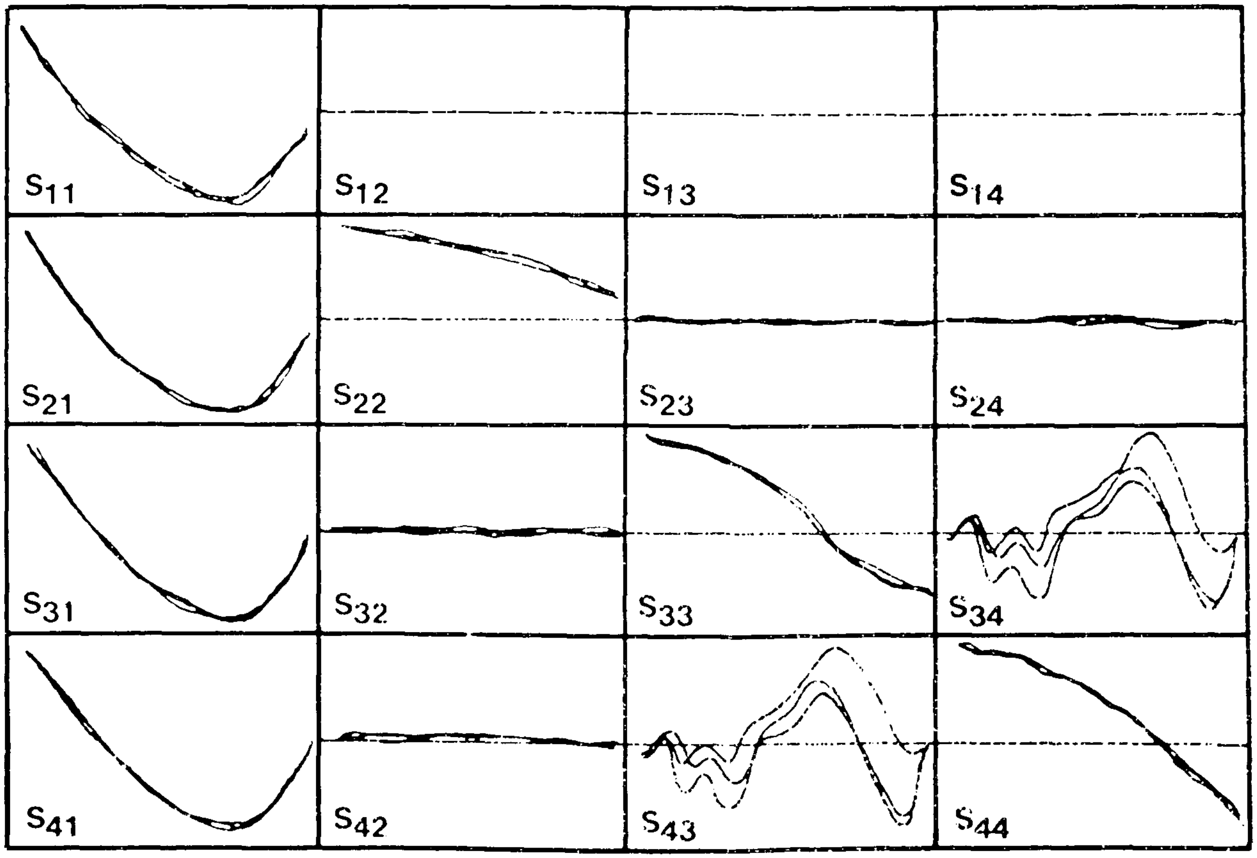
MUELLER MATRIX FOR THREE POLLENS

MESQUITE, RHUS LANCIA, BLACK WILLOW



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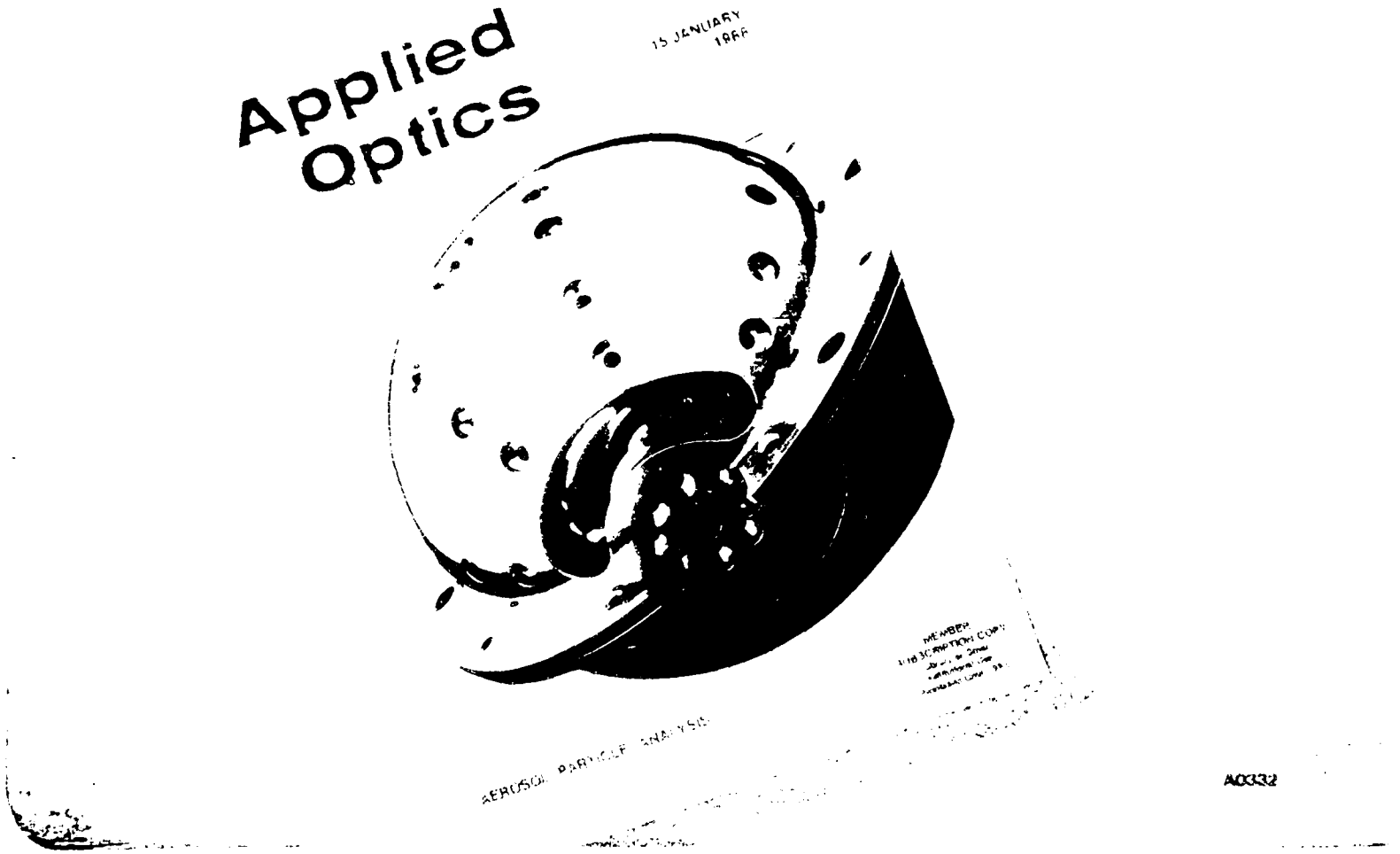
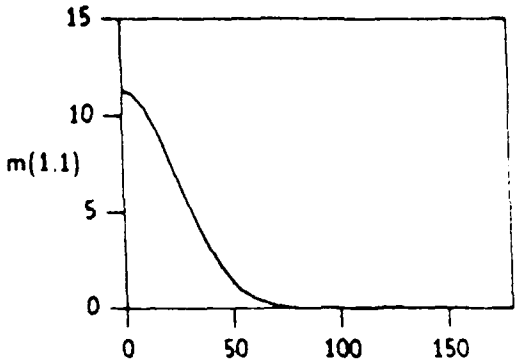
SUBMICRON PARTICLE ANALYZER



Mueller Matrix element for Layered Sphere



Scattering angle in degrees
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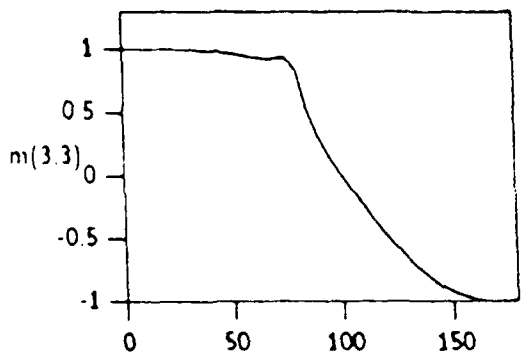
ka=3.11

Mueller Matrix element for Layered Sphere



Scattering angle in degrees
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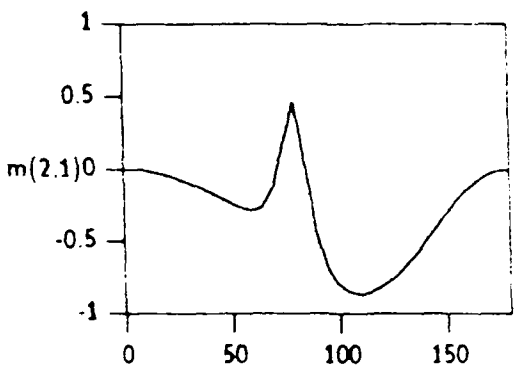
ka=3.11

Mueller Matrix element for Layered Sphere



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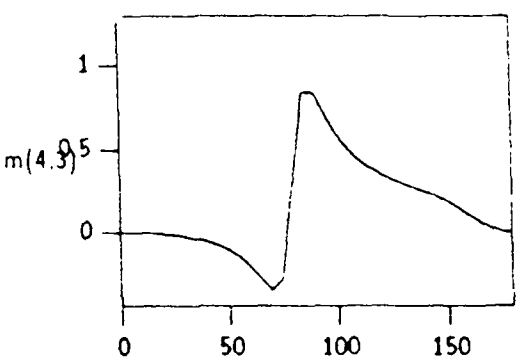

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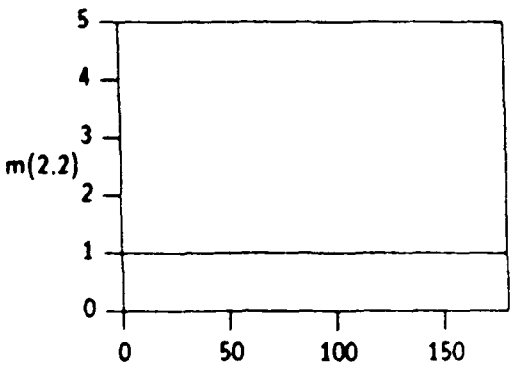

Scattering angle in degrees
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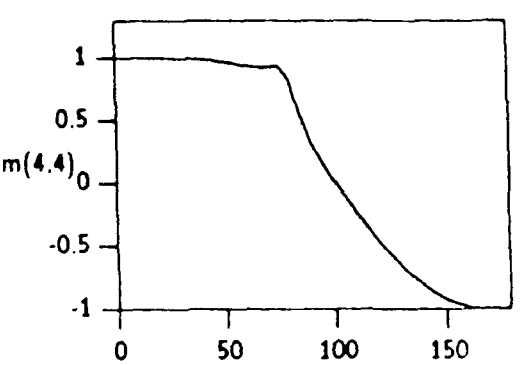
ka=3.11

Mueller Matrix element for Layered Sphere



Scattering angle in degrees
m1=(1.33, .0) ,m2=(1.60 .0)
ka=3.11

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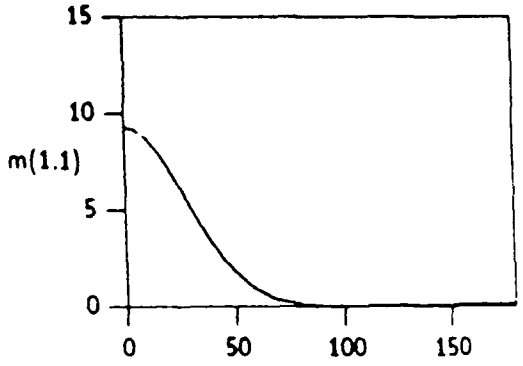

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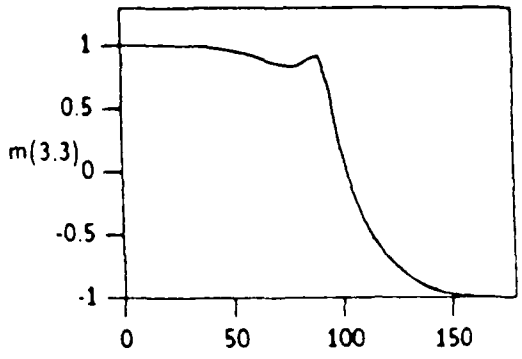
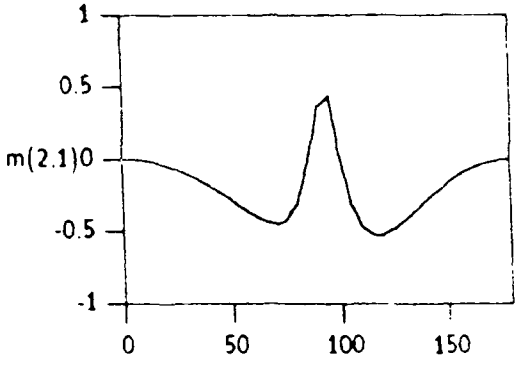


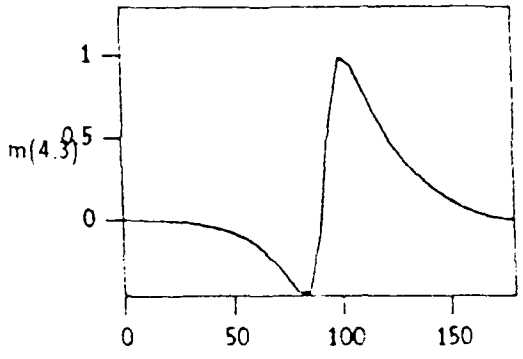
Scattering angle in degrees
m1=(1.34, .0) ,m2=(1.58, 0)
ka=2.81

Mueller Matrix element for Layered Sphere



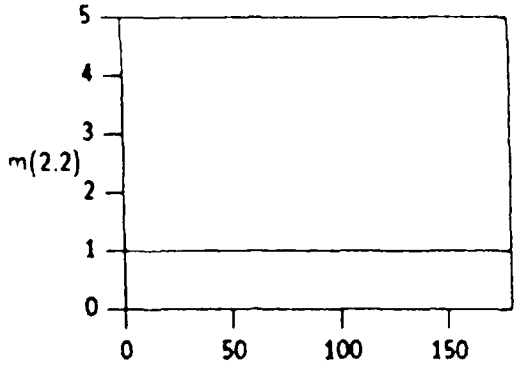
Scattering angle in degrees
m1=(1.34, .0) ,m2=(1.58, .0)
ka=2.81

Mueller Matrix element for Layered Sphere



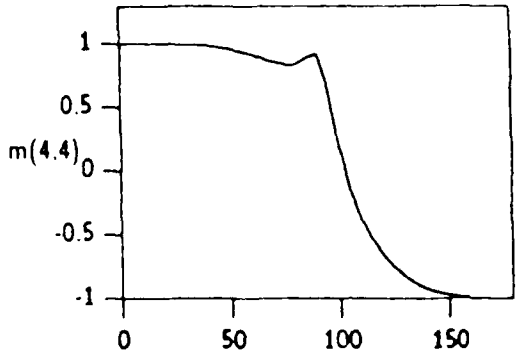
Scattering angle in degrees
m1=(1.34, .0) ,m2=(1.58, .0)
ka=2.81

Mueller Matrix element for Layered Sphere



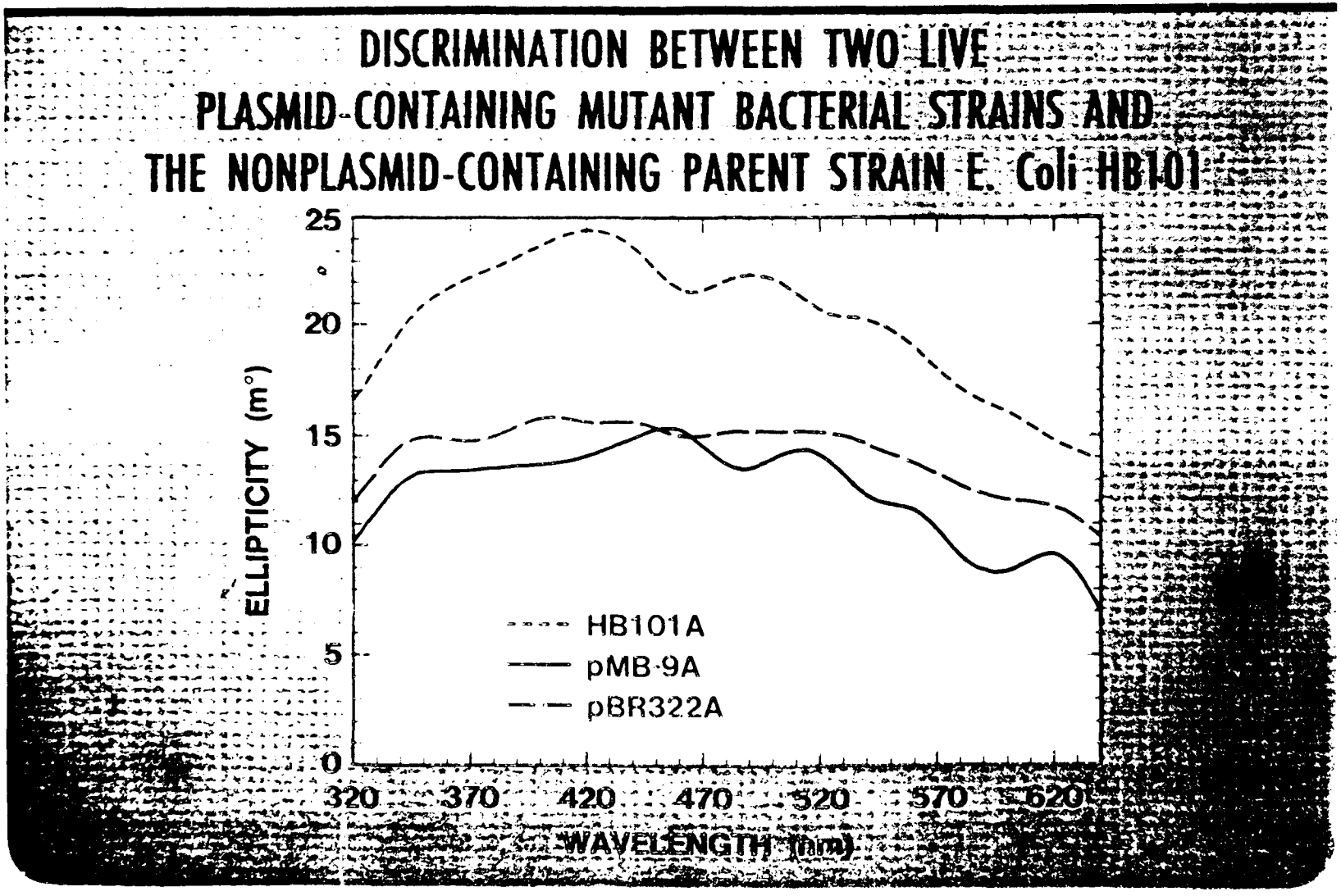
Scattering angle in degrees
m1=(1.34, .0) ,m2=(1.58, .0)
ka=2.81

Mueller Matrix element for Layered Sphere



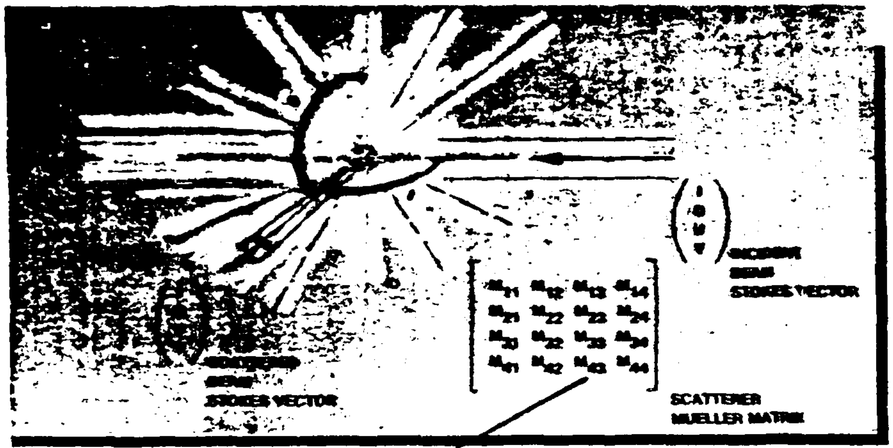
Scattering angle in degrees
m1=(1.34, .0) ,m2=(1.58, .0)
ka=2.81

CIDS DISCRIMINATION



U.S. ARMY CRDEC - BIODETECTION

MUELLER MATRIX LIGHT SCATTERING

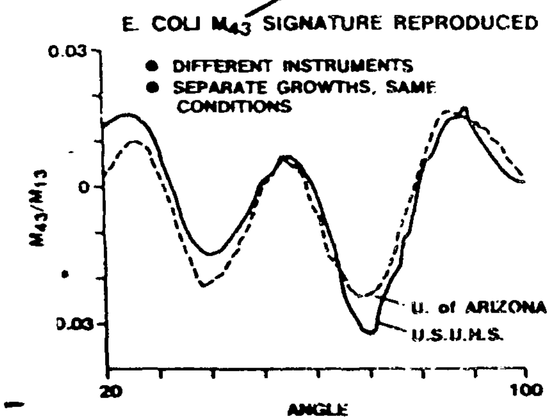


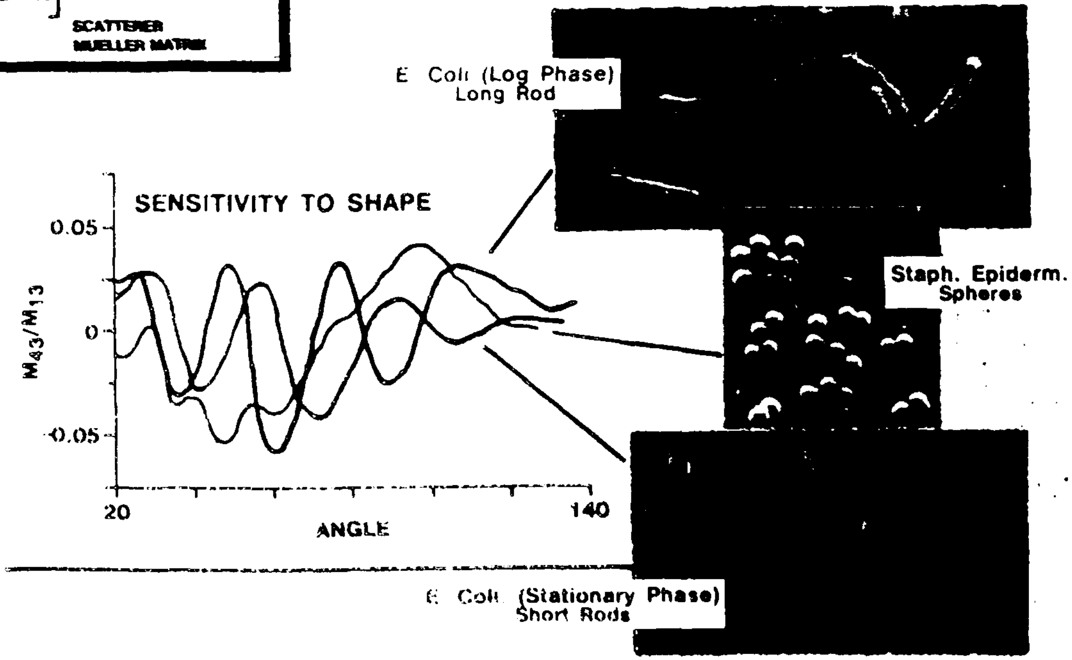
LONG TERM GOAL:

- EXPLORE OPTICAL METHODS OF BIODETECTION

SHORT TERM GOALS:

- SET UP TWO LABS FOR MUELLER MATRIX SCATTERING (✓ 1988)
- DEMONSTRATE REPRODUCIBILITY FOR SEPARATE BACTERIAL GROWTHS IN TWO DIFFERENT LABORATORIES (✓ 1989)
- PROBE SENSITIVITY LIMITS FOR BACTERIA (IN PROGRESS)
- CORRELATE MEASUREMENT CHANGES WITH PHYSICAL PROPERTIES OF LIVING CELLS





AD332-V8 1797-01

AEROSOL SCIENCE RESEARCH

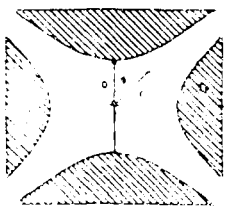
APBI TOPICS

HANDLING AND ANALYSIS OF SINGLE AEROSOL PARTICLES (1 - 100 μm DIAMETER)

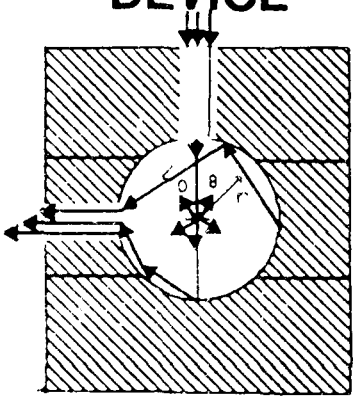
- **STORAGE**
- **MIXING**
- **SPECTROSCOPY**
- **TEMPERATURE**

NEW DESIGNS FOR SINGLE PARTICLE HANDLING

STANDARD HYPERBOLIC

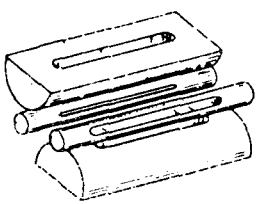


SPHERICAL VOID DEVICE



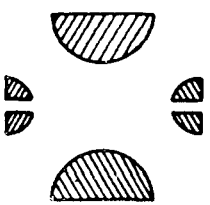
SHOWN TO COMBINE OPTICAL INTEGRATION AND LEVITATION (N.Y. POLY-ARNOLD)

LINEAR LEVITATOR



PERMITS MULTIPLE PARTICLE HANDLING (NRL-CRDEC COLLABORATION EVERSOLE, LIN, BRONK)

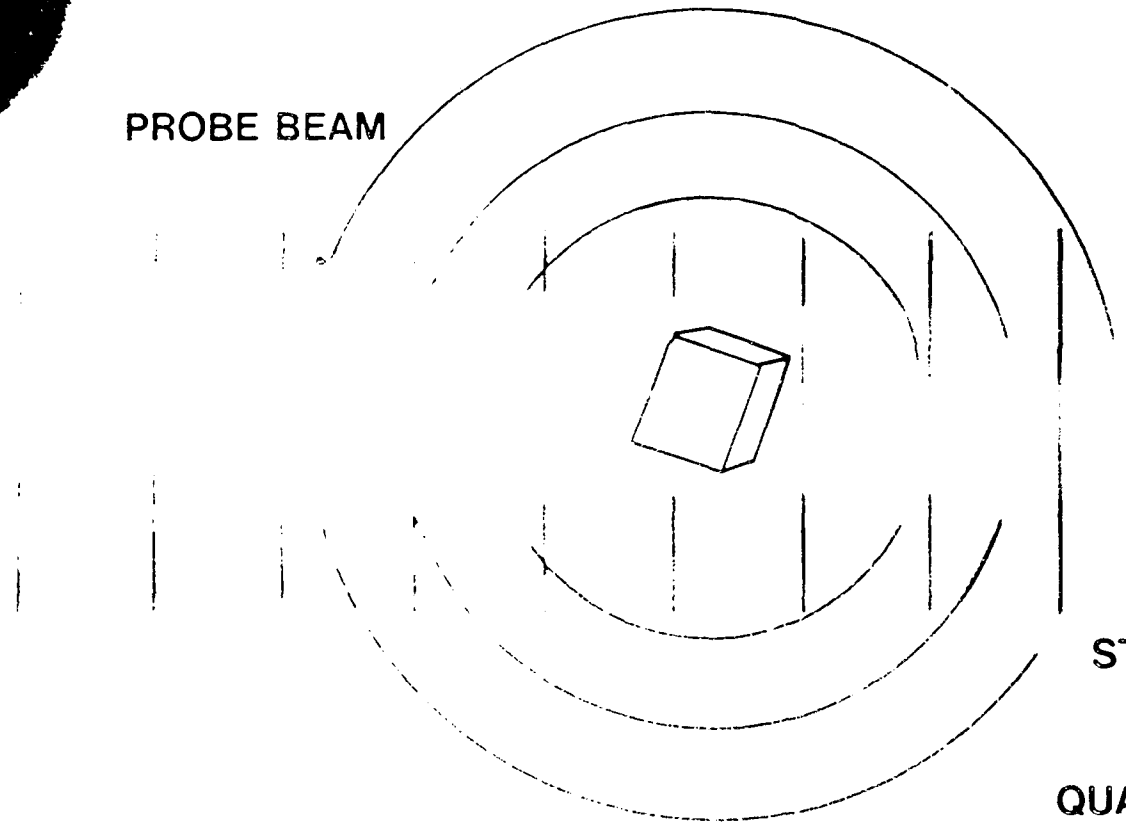
MODIFIED STANDARD



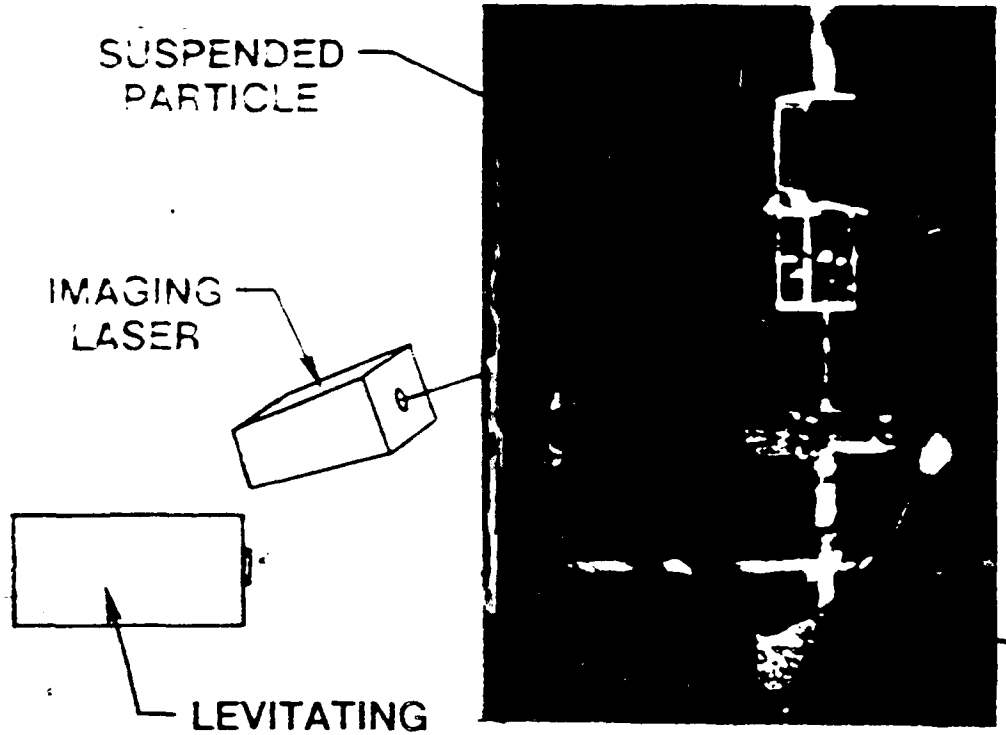
SHOWN TO PERMIT CHARGE AND MASS MEASURMENT

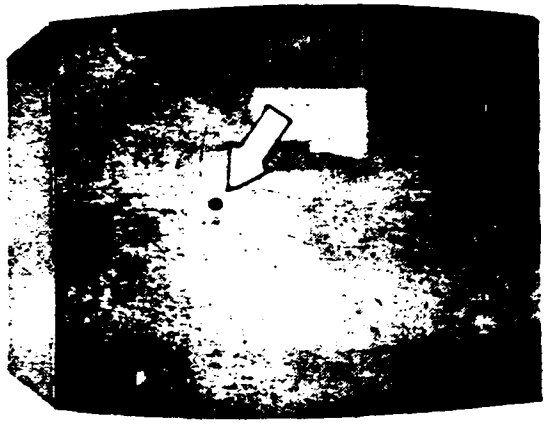
AO332-08 0616-01

ORIENTATION CONTROL OF MICRON SIZE PARTICLE



MICRO PARTICLE SUSPENSION





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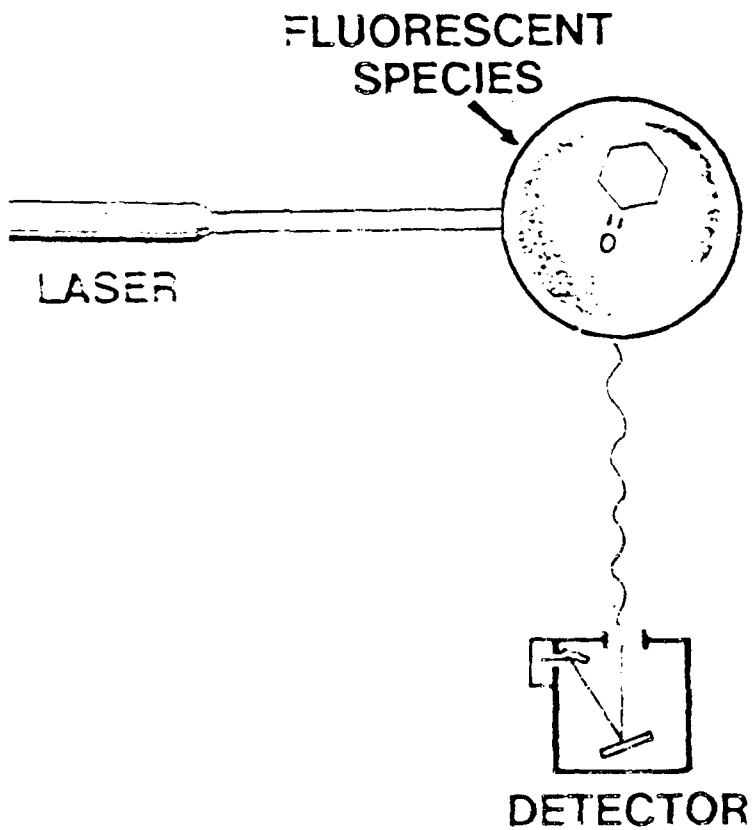
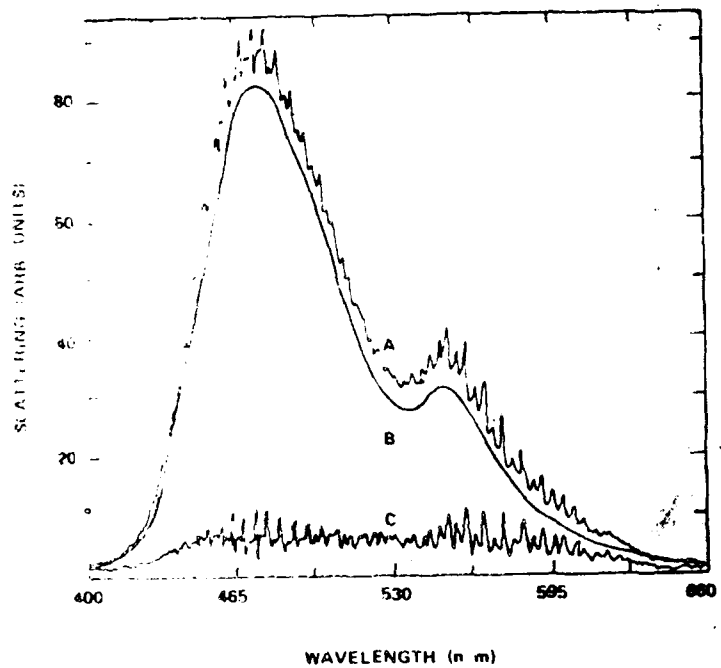
SINGLE PARTICLE FLUORESCENT SPECTROSCOPY





ENHANCED COUPLING PROBABLY DUE TO RESONANCES

Fluorescence emission spectra from a 10-μm-diam. glycerol droplet containing two dyes. Curve A was taken with the chamber cooled to 13°C. Curve B is the spectrum of a similar particle taken at room temperature. Curve C is the difference between A and B.

A0332

AEROSOL SCIENCE RESEARCH

APBI TOPICS

INVERSION OF POLARIZED LIGHT SCATTERING FROM SINGLE AEROSOL PARTICLES TO CHARACTERIZE

- SIZE (0.1 – 50 μm)
- SHAPE (FIBER, FLAKE, ISOMETRIC, SPHERE)
- COMPOSITION (REFRACTIVE INDEX, LAYERS, BIOLOGICAL IDENTITY)

HANDLING AND ANALYSIS OF SINGLE AEROSOL PARTICLES (1 – 100 μm DIAMETER)

- STORAGE
  - MIXING
    - SPECTROSCOPY
      - TEMPERATURE

U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND
CHEMICAL RD&E CENTER

SPECTROSCOPY OF CB MATERIALS

by

DR. R. LONG
Research Directorate

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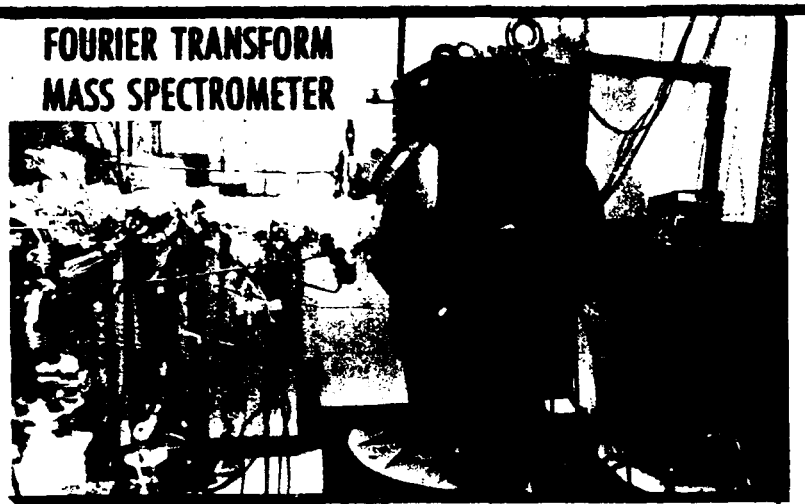
AUTOVON (584) 2437

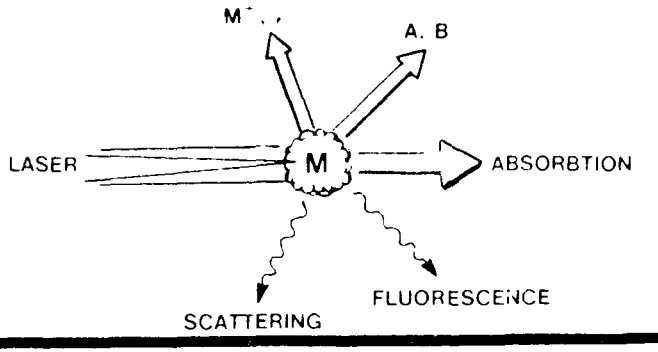
AO332-C-C9-224954

WA-06 SPECTROSCOPY

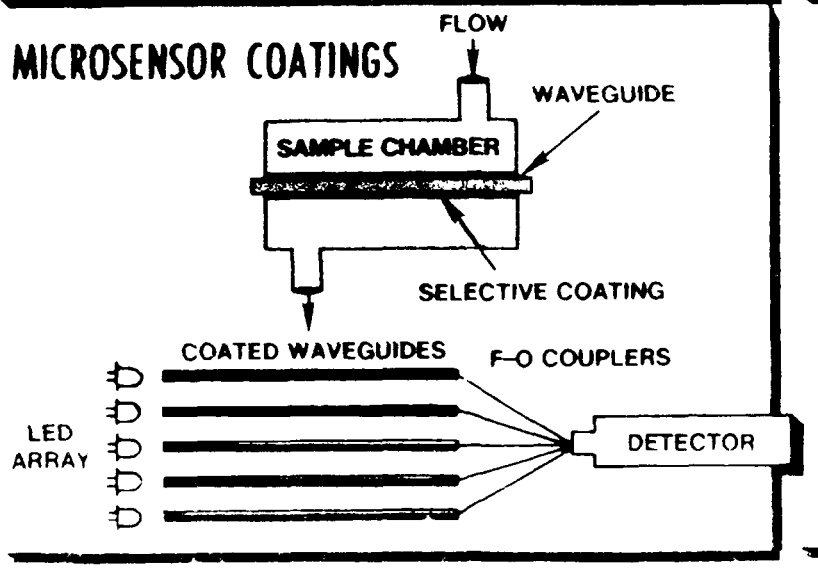
FOURIER TRANSFORM MASS SPECTROMETER



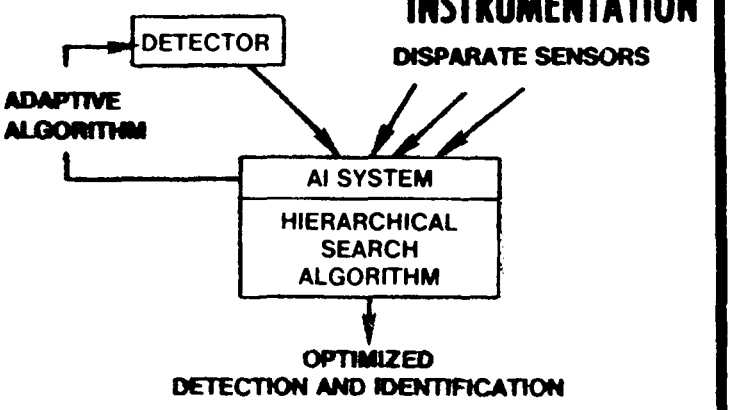
LASER INTERACTION WITH CHEMICALS



MICROSENSOR COATINGS

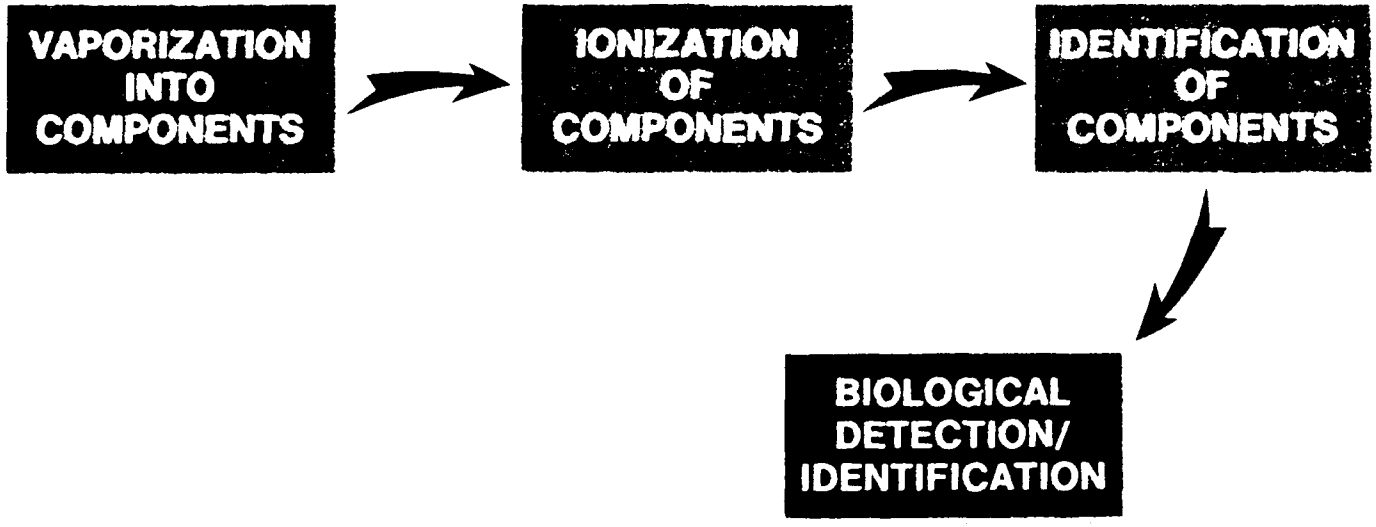


INTELLIGENT INTEGRATED INSTRUMENTATION



A0332-09-0663-01

MASS SPECTROMETRIC DETECTION OF BIOLOGICALS



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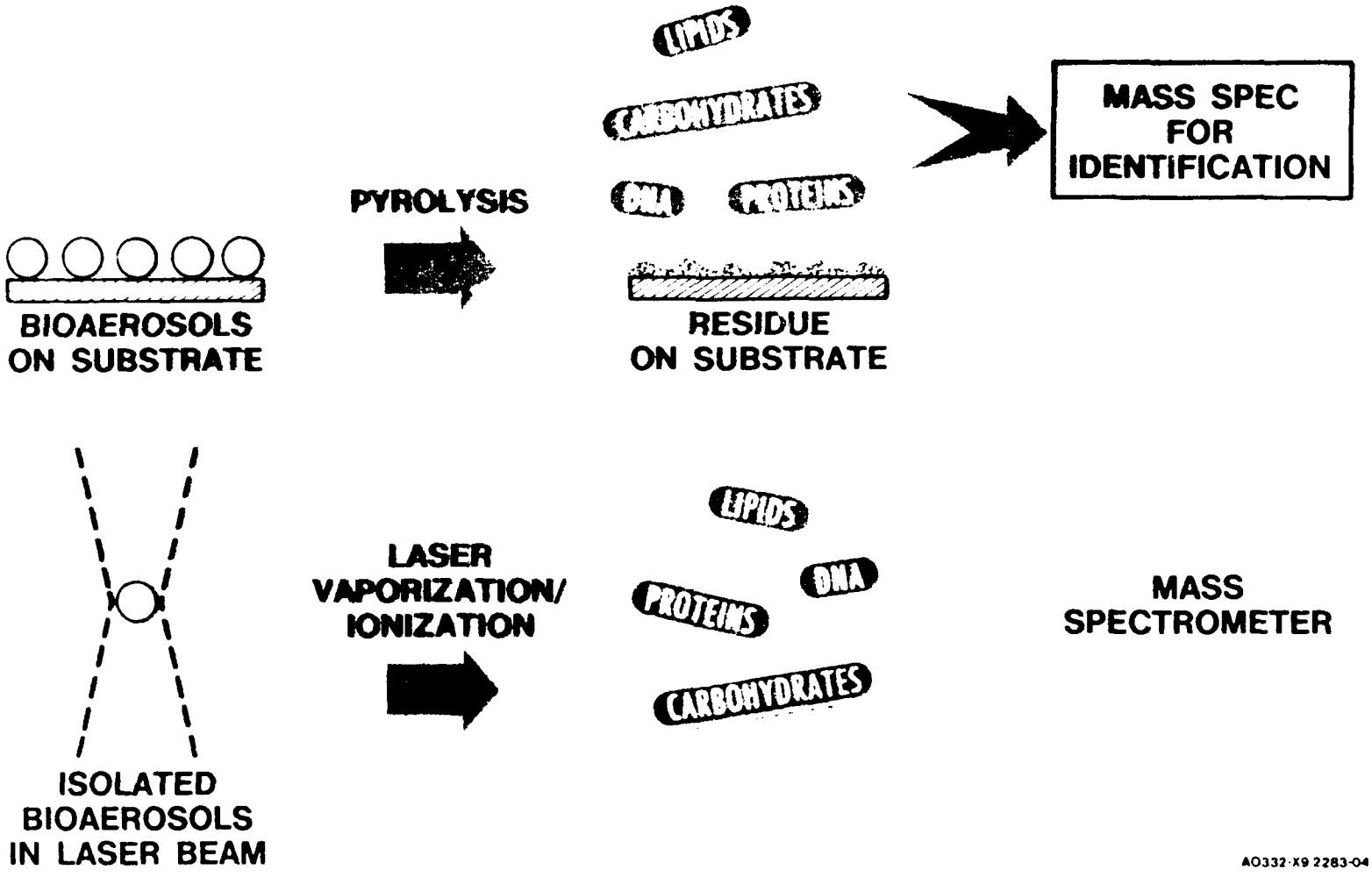
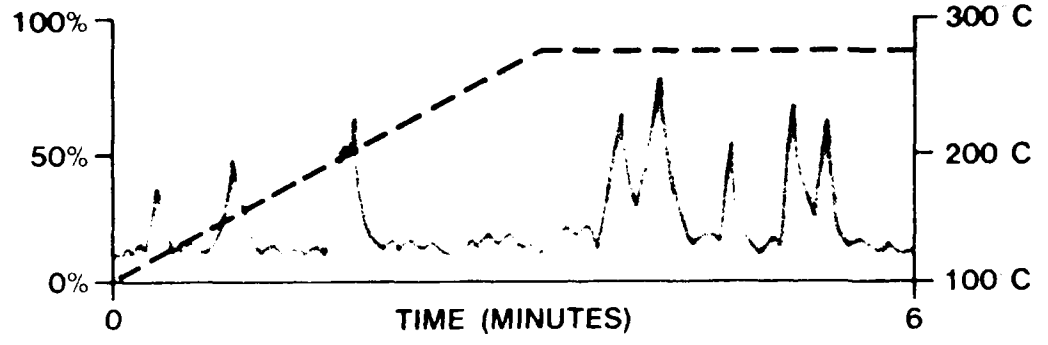
LASER VAPORIZATION VERSUS PYROLYSIS

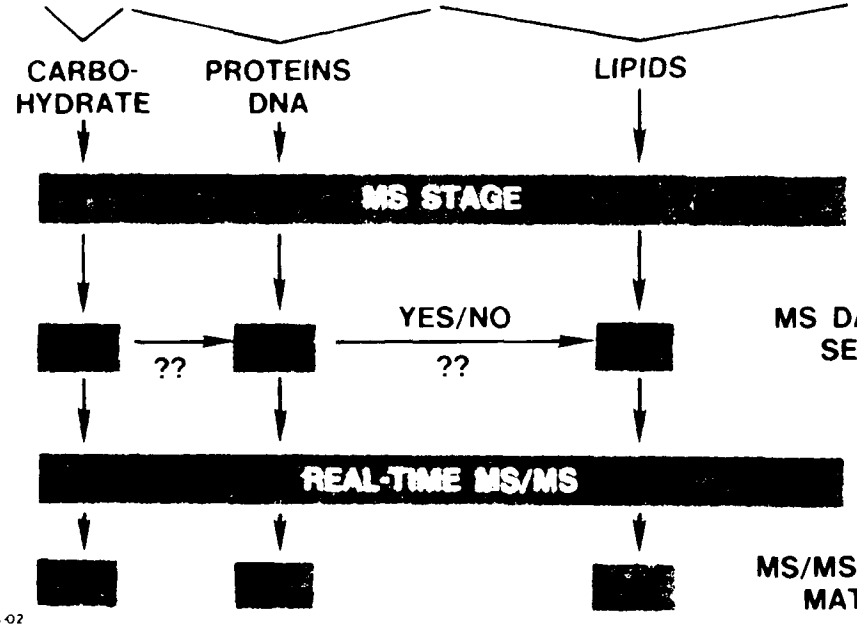


AO332-X9 2283-04

SAMPLE PROBLEM
AI APPROACH FOR PYROLYSIS-GC/MS/MS



CHROMATOGRAM



GC STAGE GIVES TIME SEPARATION OF SPECTRA

AI INTELLIGENT INSTRUMENTATION

MS DATABASE SEARCH

ABORT/CONTINUE DECISIONS

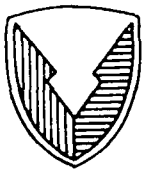
AI SPECTRAL INTERPRETATION

MS/MS SPECTRA MATCHING

DETECTION AND IDENTIFICATION

AD332 KS 2283-02

NEURAL NETWORKS



- NEWEST FIELD OF AI
- SELF-TRAINING
- CAPABLE OF KNOWLEDGE GENERALIZATION
- CAN LEARN RULES OR CORRELATIONS UNKNOWN TO HUMAN EXPERTS
- OBVIATE SUBJECTIVE HUMAN INPUT

A0332-X9 2283-10

POTENTIAL APPLICATIONS OF NEURAL NETWORKS

- ENHANCEMENT OF DETECTION SYSTEMS
- ROBOTICS
- INTERPRETATION OF VISUAL IMAGES
  - TREATY VERIFICATION VIA SATELLITE-BASED RECONNAISSANCE

AO332-X9 2263-06

NEEDS IN NEURAL NETWORKS

- DEVELOPMENT OF TESTING AND VALIDATION TECHNIQUES TO FACILITATE CHOICE OF APPROPRIATE NETWORK ARCHITECTURE
- DEVELOPMENT OF TECHNIQUES TO INCORPORATE EXISTING KNOWLEDGE INTO NETWORK
- IMPROVED UNDERSTANDING OF REASONS FOR SUCCESS WHEN SYSTEM WORKS AND FOR FAILURE WHEN SYSTEM DOES NOT WORK

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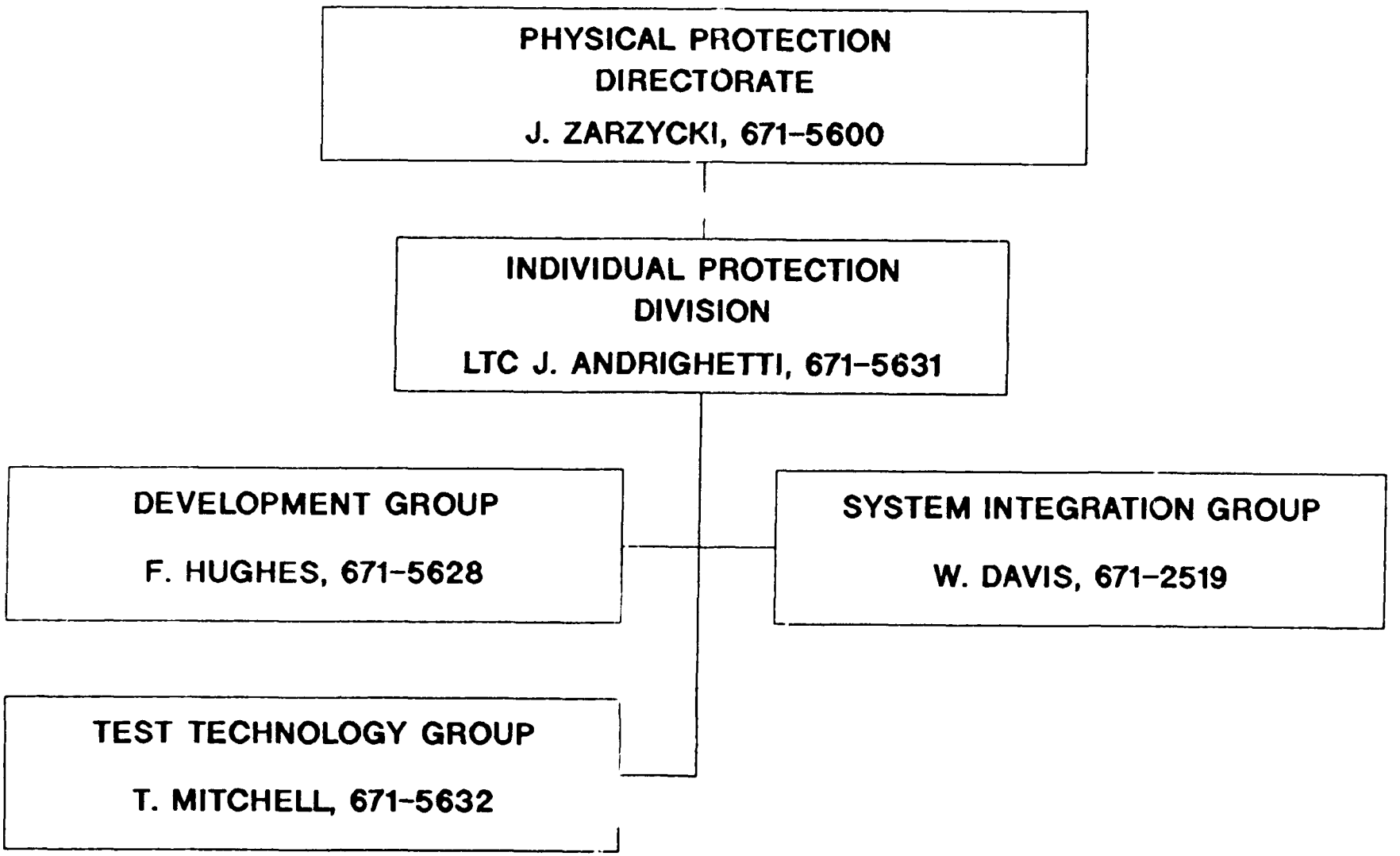
INDIVIDUAL PROTECTION

by

MR. RICHARD W. BRLETICH
Physical Protection Directorate

SMCCR-PPI
AREA CODE (301) 671-5912
AUTOVON (584) 5912

INDIVIDUAL PROTECTION



INDIVIDUAL PROTECTION

MISSION STATEMENT

- DEVELOP "OPERATIONALLY" EFFECTIVE PROTECTIVE EQUIPMENT
  - CRDEC (EYE AND RESPIRATORY)
  - NRDEC (BODY, HANDS, AND FEET)
- DEVELOPMENT/SUPPORT THROUGH PRODUCTION
- TRI-SERVICE CENTER OF EXCELLENCE FOR INDIVIDUAL PROTECTION
- TRI-SERVICE COORDINATION POINT FOR INDIVIDUAL PROTECTION

INDIVIDUAL PROTECTION

M43E1 MASK

DESCRIPTION:

- P3I VERSION OF THE M43 MASK FOR ALL AVIATION
- IMPROVEMENTS INCLUDE:
  - OXYGEN ADAPTABILITY
  - MOTOR/BLOWER WITH STANDARD BATTERY
  - AUXILLARY MOTOR/BLOWER
  - NBC SURVIVABILITY
  - FACEPIECE ASSEMBLY CARRIER

CONTRACT OPPORTUNITIES

FY91 50M - 60M*

*NOTE: THREE YEAR PRODUCTION

STATUS:

- ENGINEERING DEVELOPMENT

KEY MILESTONE:

- TYPE CLASSIFICATION - 1QFY91

POC - MR. D. R. WHITCRAFT (301) 671-5768

INDIVIDUAL PROTECTION

M40 MASK P3I PROGRAM

CONTRACT OPPORTUNITIES

FY90 500K - 1000K

DESCRIPTION:

JSOR P3I REQUIREMENTS

- QUICK DOFF/SECOND SKIN HOOD
- COMMUNICATION SYSTEM
- CANISTER INTEROPERABILITY
- BALLISTIC/LASER EYE PROTECTION

STATUS:

- P3I SCHEDULED FOR FY90-91

KEY MILESTONES:

- CONTRACT AWARD - 1QFY90

POC - MR. W. M. FRITCH (301) 671-5911

INDIVIDUAL PROTECTION

TECHNOLOGY PLAN, 6.2

- DEVELOPMENT
  - AIRCREW PROTECTIVE MASK
  - RESPO 21
- SYSTEM INTEGRATION
  - PHYSIOLOGICAL MASK TESTING
  - FIELD EQUIPMENT INTEGRATION
  - SENSORY
- TEST TECHNOLOGY
  - PF TESTING
  - STANDARD TEST METHODS
  - NONDESTRUCTIVE TEST METHODS
  - FULL ENSEMBLE TEST MEHTODS

INDIVIDUAL PROTECTION

AIRCREW PROTECTIVE MASK

CONTRACT OPPORTUNITIES

FY90	50K - 100K
FY91	500K - 1000K
FY92	500K - 1500K

DESCRIPTION:

- ADDRESS LIMITATIONS OF M43E1:
  - PROVIDE PROTECTION IN UMBLOWN MODE
  - ANTIFOG/DEFOG IN UNBLOWN MODE
  - IMPROVED SIZING, FITTING, RAM-D
  - REDUCED COST
  - REDUCED LOGISTICAL AND OPERATIONAL BURDEN
- MAINTAIN COMPATABILITY WITH AVIATION SIGHTING SYSTEMS (ANVIS, LHX)
- FULL SPECTRUM OF VISUAL CORRECTION

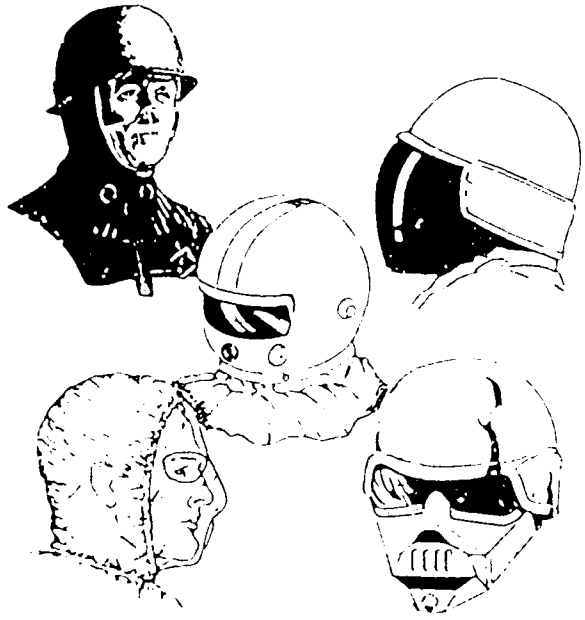
KEY TECHNOLOGIES:

- LENS DESIGN/PLACEMENT IN FACEPIECE ASSEMBLY
- BLOWN AND/OR UNBLOWN FACEPIECE AIR MANAGEMENT SYSTEM
- PORTABLE MOTOR/BLOWER
- MODULAR COMPONENTS

POC - MR. R. W. BRLETICH (301) 671-5912

INDIVIDUAL PROTECTION

RESPO 21



DESCRIPTION:

- MINIMUM MISSION DEGRADATION
- OPTIMUM INTEGRATION
- MAINTAIN PROTECTION

STATUS:

- TECH BASE
- ADVANCE DEVELOPMENT - 1QFY94

POC - DR. C. M. GROVE (301) 671-5694

CONTRACT OPPORTUNITIES

FY90	50K - 100K
FY91	50K - 150K
FY92	200K - 300K

INDIVIDUAL PROTECTION

CRITICAL TECHNOLOGIES

- MATERIALS
  - COPOLYMERS/COMPOSITES/ALLOYS
  - CONFORMABLE
  - SEMIPERMEABLE MEMBRANES
- POWER SOURCES
- MANUFACTURING
- COMMUNICATION
- OPTICS
  - LENS DESIGN
  - COATINGS
  - FILTERS
  - DISPLAYS
- AIR MANAGEMENT

INDIVIDUAL PROTECTION

RESPIRATORY PHYSIOLOGY/BIOENGINEERING

- PROTECTIVE EQUIPMENT CREATES MAJOR PHYSIOLOGICAL BURDENS FOR THE SOLDIER IN AREAS OF RESPIRATION, VISION, SPEECH/ HEARING, THERMAL LOAD, SIZING AND MOBILITY

- CRDEC HAS ESTABLISHED A NEW ADVANCED PROTECTION SYSTEMS INTEGRATION LABORATORY TO INVESTIGATE THESE PROBLEMS AND FIND SOLUTIONS TO BE INCORPORATED INTO FUTURE NBC PROTECTIVE EQUIPMENT

INDIVIDUAL PROTECTION

SUMMARY OF CONTRACTOR OPPORTUNITIES

PRODUCTION

YEAR	PROJECT	FUNDING LEVEL	POC
1991	M43E1	50M - 60M	MR. D. R. WHITCRAFT (301) 671-5768

INDIVIDUAL PROTECTION

SUMMARY OF CONTRACTOR OPPORTUNITIES

DEVELOPMENT

YEAR	PROJECT	FUNDING LEVEL	POC
1990	ACPM TECH BASE	50K - 100K	MR. R. W. BRLETICH (301) 671-5912
	RESPO 21 TECH BASE	50K - 100K	MR. C. M. GROVE (301) 671-5694
	M40 P3I ENG. DEV.	500K - 1000K	MR. W. M. FRITCH (301) 671-5911
1991	ACPM ADV. DEV.	500K - 1000K	MR. R. W. BRLETICH (301) 671-5912
	RESPO 21 TECH BASE	50K - 150K	MR. C. M. GROVE (301) 671-5694
1992	ACPM ADV. DEV.	500K - 1500K	MR. R. W. BRLETICH (301) 671-5912
	RESPO 21 TECH BASE	200K - 300K	MR. C. M. GROVE (301) 671-5694

INDIVIDUAL PROTECTION

SUMMARY

INDIVIDUAL PROTECTION HAS RECENTLY TYPE CLASSIFIED SEVERAL NEW SYSTEMS. THE NEXT GENERATION OF EQUIPMENT IS BEING DESIGNED TO MEET THE NEED OF THE 21ST CENTURY. THE TIME TO DEVELOP NEW AND NOVEL APPROACHES TO INDIVIDUAL PROTECTION IS NOW. WE IN THE INDIVIDUAL PROTECTION DIVISION ARE DEPENDING HEAVILY ON YOU IN INDUSTRY TO HELP US MEET OUR GOALS.

OUR SUCCESS DEPENDS ON THE ABILITY OF INDUSTRY TO PUSH BACK THE FRONTIERS IN INDIVIDUAL PROTECTION

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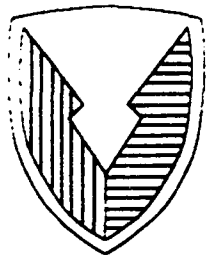

U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

COLLECTIVE PROTECTION

by

MR. J. MOK/MR. R. PUHALA
Physical Protection Directorate

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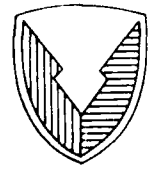
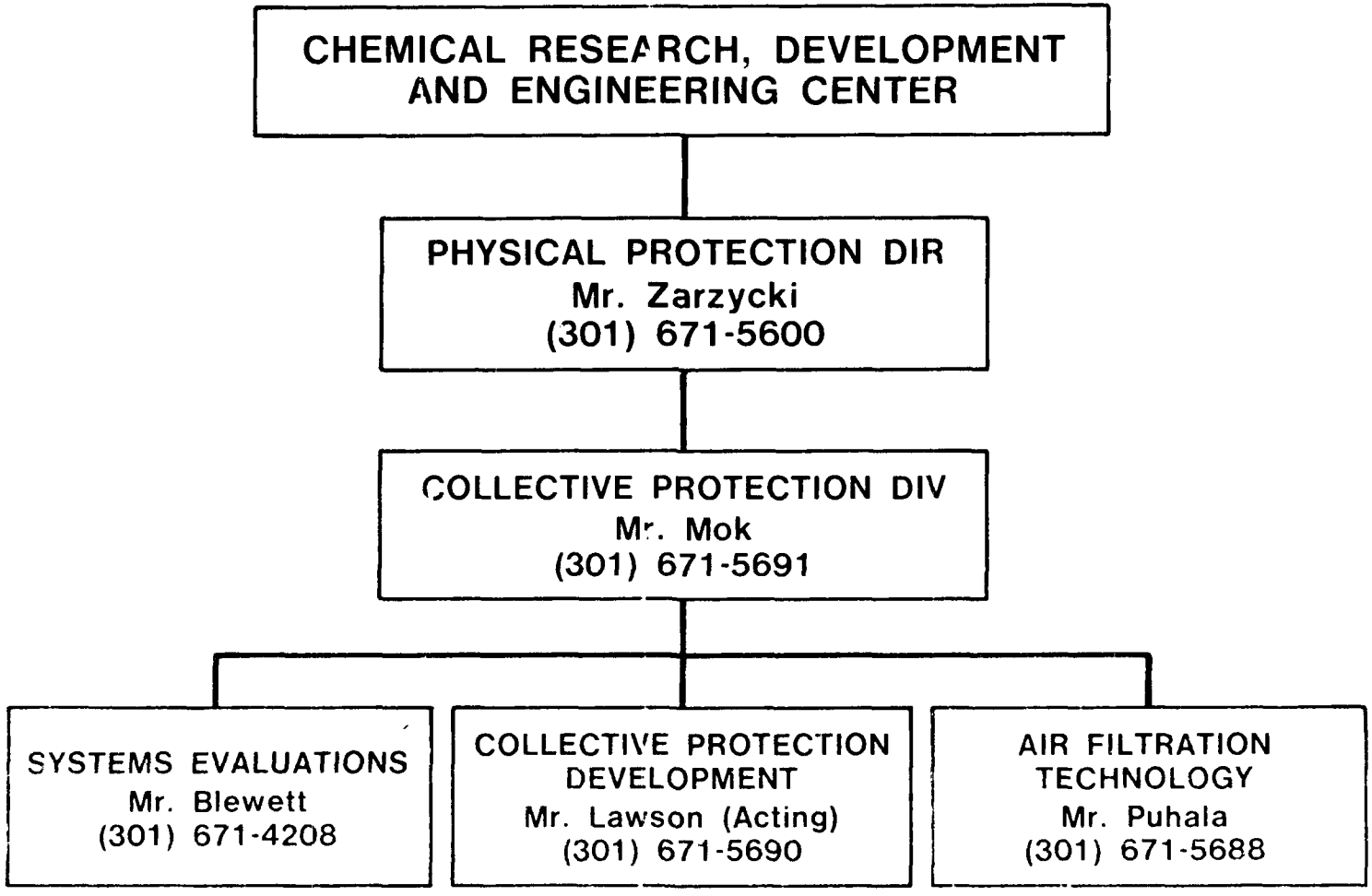
AUTOVON (584) 5691/5621

AO332-C-C9-224956

COLLECTIVE PROTECTION





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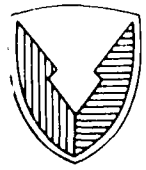
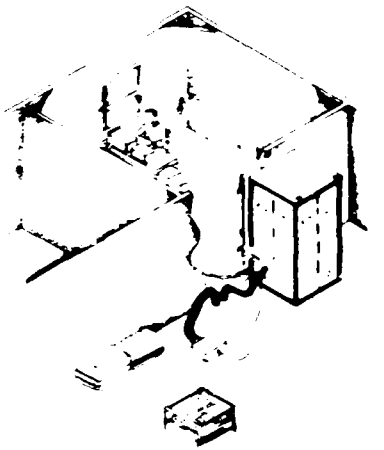
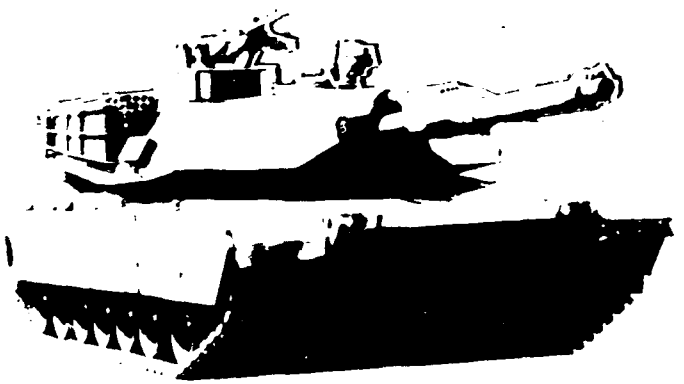
COLLECTIVE PROTECTION

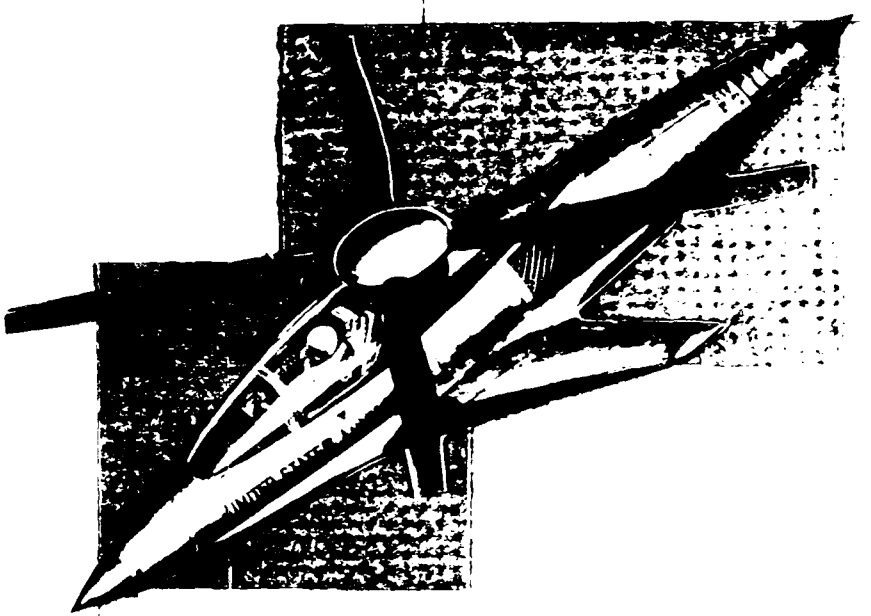


- "CLEAN" AIR SOURCE
- PROTECTED AREA
- ENTRY/EXIT

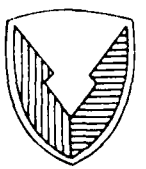
COLLECTIVE PROTECTION







COLLECTIVE PROTECTION OBJECTIVES



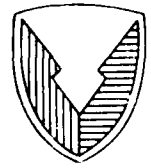
- ASSURE FULL CB PROTECTION WITH ENVIRONMENTAL CONTROL INTEGRATION
- ASSURE EASE OF ENTRY/EXIT
- MINIMAL SIZE AND WEIGHT
- MAXIMIZE LIFE OF AIR PURIFIER

- MINIMAL OPERATIONAL DEGRADATION
- NBC SURVIVABILITY

YIELDS

SUSTAINED OPERATIONS
in a
CB ENVIRONMENT

COLLECTIVE PROTECTION



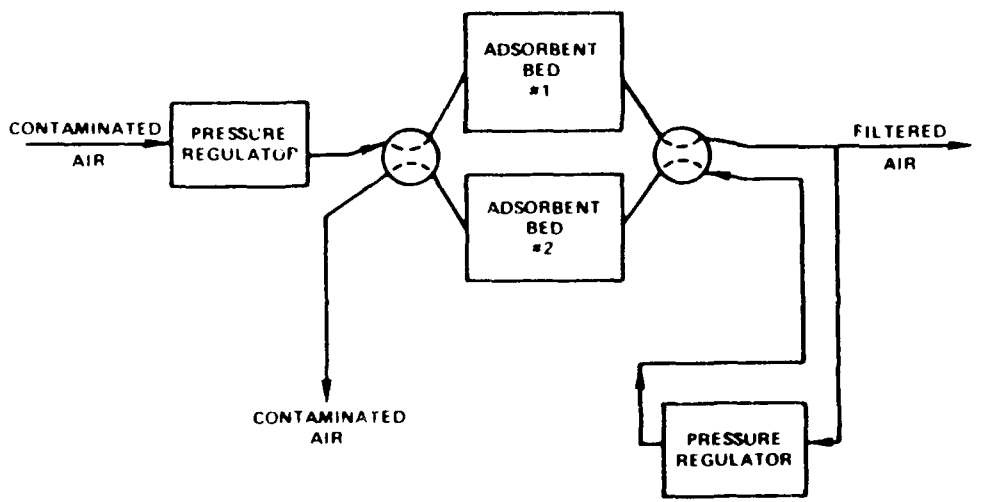
6.2

EXPLORATORY DEVELOPMENT

- PRESSURE SWING ADSORPTION
- REACTIVE BED PLASMA

COLLECTIVE PROTECTION

PRESSURE SWING ADSORPTION



- USES PRESSURE DIFFERENTIAL TO ALTERNATIVELY ADSORB AND DESORB FROM TWO SORBENT BEDS

STATUS:

- LABCRATORY TEST STAND DELIVERED TO CRDEC
- BRASSBOARD DEVELOPED
- SIMULANT AGENT CHAL-LENGE OF BRASSBOARD
- LABORATORY TESTS CONDUCTED

COLLECTIVE PROTECTION

PRESSURE SWING ADSORPTION
PLANNED EFFORTS
FY 90 - 92

- EXTENSIVE LABORATORY DATA ACQUISITION
- HARDWARE DEVELOPMENT

COLLECTIVE PROTECTION

PRESSURE SWING ADSORPTION LABORATORY DATA ACQUISITION

- EFFORT: CONDUCT EXTENSIVE LABORATORY TEST/ANALYSIS ON CW AGENT/SIMULANT ISOTHERMS
- CAPABILITIES
  - EXPERIENCE IN CONDUCTING CW AGENT AND SIMULANT EXPERIMENTS
  - EXPERIENCE IN ISOTHERM/MASS TRANSFER MEASUREMENTS
  - DATA ANALYSIS
- CONTRACT AWARD PLANNED FOR 2Q FY 90
- POC: PROCUREMENT DIRECTORATE
  TIMOTHY M. FRAZIER
  301-671-2541

AO332-W9 2248-03

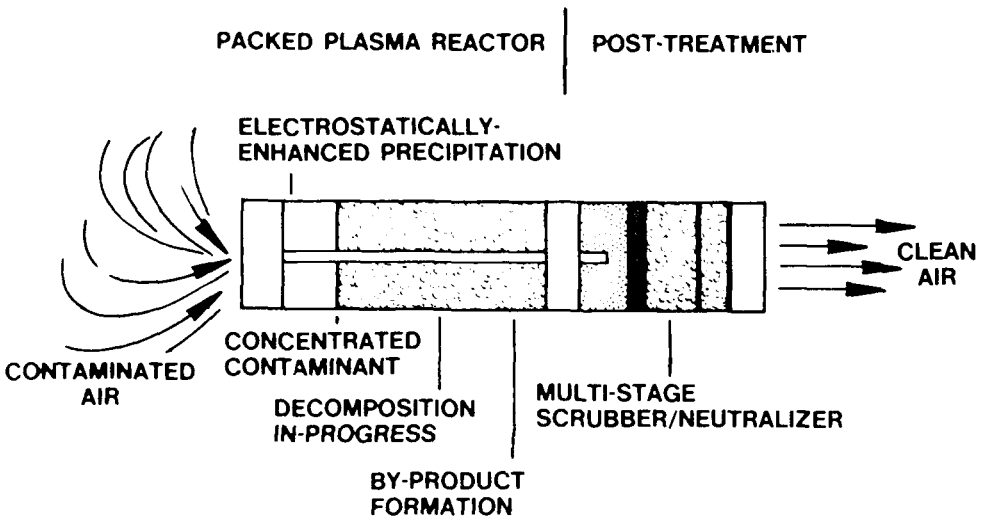
COLLECTIVE PROTECTION

PRESSURE SWING ADSORPTION HARDWARE DEVELOPMENT

- EFFORT: DESIGN, FABRICATE AND TEST THREE FULL-SCALE BREADBOARD/BRASSBOARD SYSTEMS
- CAPABILITIES
  - DESIGN AND FABRICATION EXPERIENCE WITH PRESSURE VESSELS
  - SYSTEM INTEGRATION (i.e., PSA TECHNOLOGY, ECU, APU, SYSTEM CONTROLS, ETC.)
  - TESTING EXPERIENCE (i.e., MIL SPEC 810-D)
- CONTRACT AWARD PLANNED FOR 3Q - 4Q FY 90
- POC: PROCUREMENT DIRECTORATE
  TIMOTHY M. FRAZIER
  301-671-2541

AO332-X9 2248-02

REACTIVE BED PLASMA TECHNOLOGY



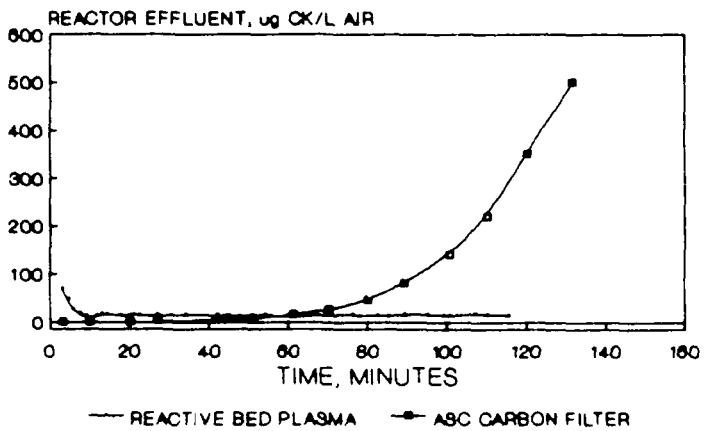
TECHNOLOGY OBJECTIVES

- ALL AGENT PROTECTION
- MINIMIZED LOGISTICS BURDEN
  - NO FILTER CHANGE-OUT
  - MAINTENANCE SAFETY

RESULTS

CHEMICAL PROCESSING	% DECOMPOSITION
GD (NERVE AGENT)	> 99.8 %
AC (HYDROGEN CYANIDE)	> 99.4 %
CK (CYANOGEN CHLORIDE)	> 99.0 %
CYANOGEN	> 99.8 %
METHYL CYANIDE	99 %
CG (PHOSGENE)	> 99.84%
CARBON MONOXIDE	84 %
METHANE	> 97 %
BENZENE	> 99 %
T-2 (BIOCHEMICAL)	> 99 %
BG (BIOLOGICAL)	> 99.9999%

CLCN DECOMPOSITION BY REACTIVE BED PLASMA AND ASC CARBON FILTER



CHALLENGE : 4000 ug CK/L AIR

AO332-K8 0628-08

COLLECTIVE PROTECTION

REACTIVE BED PLASMA

EFFORT: TECHNOLOGY TRANSFER OF REACTIVE BED PLASMA TECHNOLOGY TO INDUSTRY

HOW: SOLICITATION FOR INDUSTRIAL INTEREST IN COOPERATIVE R&D AGREEMENTS

STATUS: ADVERTISED IN POLLUTION ENGINEERING, SOLID STATE TECHNOLOGY, CHEMICAL ENGINEERING, AND COMMERCE BUSINESS DAILY

POC: OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS
SUSAN K. LUCKAN/RONALD P. HINKLE
301-671-2031

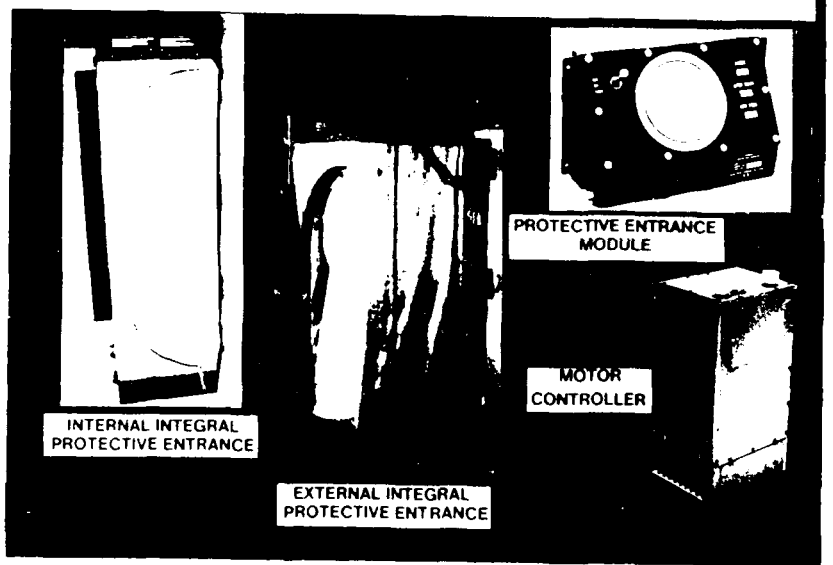
COLLECTIVE PROTECTION

PRODUCTION OPPORTUNITIES

FY90 - FY95

<$54 MILLION

MODULAR
COLLECTIVE PROTECTION EQUIPMENT



CONTRACT/PROCUREMENT INFORMATION

PROCUREMENT: FY90-FY95

PRODUCTION OPPORTUNITIES/CHALLENGES

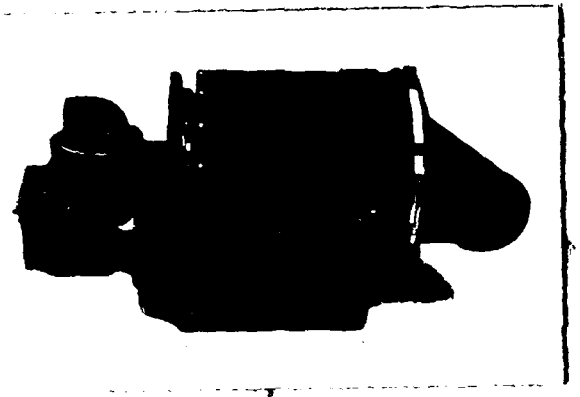
- VARIOUS MANUFACTURING DISCIPLINES (i.e., METAL, ELECTRONIC, ELECTRICAL, FABRIC, PLASTICS, AND CHEMICAL)
- SOME COMPLEX MANUFACTURING PROCESSES
- METAL CASTINGS REQUIRED.
- SPECIAL TEST PROCEDURES

POINTS OF CONTACT

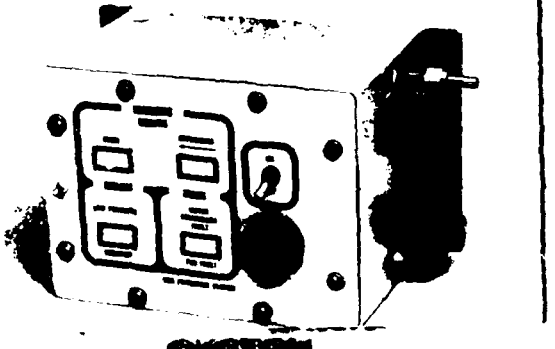
TECHNICAL: Adolfo R. Negron, (301) 671-5682
Wayne A. Gullian, (301) 671-5760
ADMIN: Susan K. Luckan, (301) 671-2031

AO332 W90038 08

MODULAR
COLLECTIVE PROTECTION EQUIPMENT



100 CFM CBRN
PARTICULATE FILTER UNIT



SYSTEM
CONTROL MODULE

CONTRACT/PROCUREMENT INFORMATION

PROCUREMENT: FY90-FY95

PRODUCTION OPPORTUNITIES/CHALLENGES

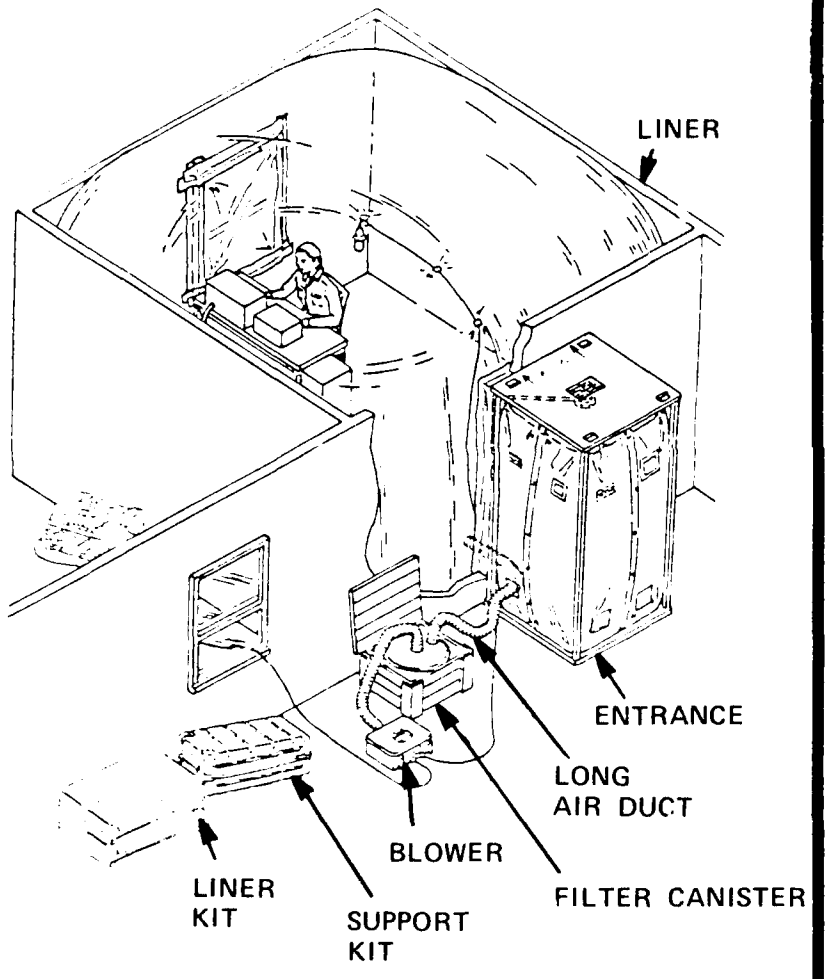
- VARIOUS MANUFACTURING DISCIPLINES (i.e., METAL, ELECTRONIC, ELECTRICAL, FABRIC, PLASTICS, AND CHEMICAL)
- SOME COMPLEX MANUFACTURING PROCESSES
- METAL CASTINGS REQUIRED.
- SPECIAL TEST PROCEDURES

POINTS OF CONTACT

TECHNICAL: Adolfo R. Negron, (301) 671-5682
Wayne A. Gulian, (301) 671-5760
ADMIN: Susan K. Luckan, (301) 671-2031

AO332-W9 0038-08

SIMPLIFIED COLLECTIVE PROTECTION EQUIPMENT (SCPE)



CONTRACT/PROCUREMENT INFORMATION

CONTRACT: COLLECTIVE PROTECTION EQUIPMENT, NBC, SIMPLIFIED M20
RFP: AUG 89
PROCUREMENT: FY89
DOLLAR AMOUNT: <$5M

PRODUCTION OPPORTUNITIES/CHALLENGES

- POLYETHYLENE MATERIAL
- HEAT SEALING REQUIRED — LABOR INTENSIVE
- AUTOMATION POSSIBLE
- CONVENTIONAL ASSEMBLY — LABOR INTENSIVE
- DIE CASTING REQUIRED
- CLOSE TOLERANCES (MOTOR BLOWER)
- MULTIPLE DISCIPLINES

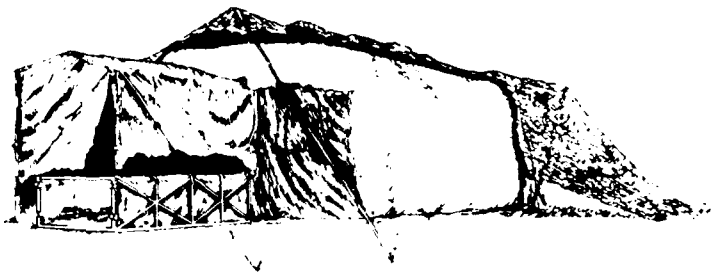
POINTS OF CONTACT

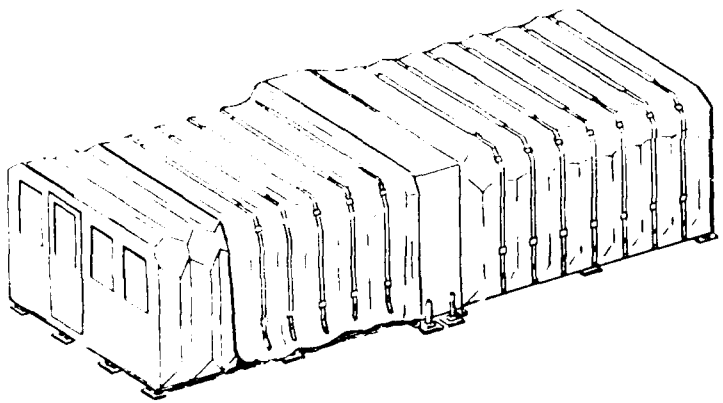
TECHNICAL: Mark Diglio, (301) 671-5759
ADMIN: Susan K. Luckan, (301) 671-2031

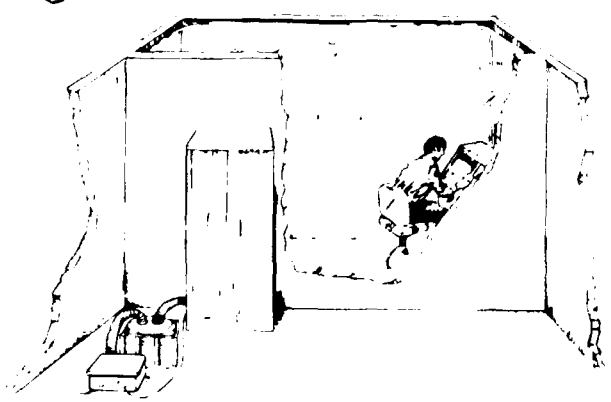
AO332-W9 0038-09

SMCCR Form 38, 1 April 1985

SIMPLIFIED COLLECTIVE PROTECTION EQUIPMENT (SCPE P3I)







CONTRACT/PROCUREMENT INFORMATION

CONTRACT: COLLECTIVE PROTECTION EQUIPMENT, NBC, SIMPLIFIED M20A1

RFP: MAR 91

PROCUREMENT: FY91 FY92-94

DOLLAR AMOUNT: <$5M <$30M

PRODUCTION OPPORTUNITIES/CHALLENGES

- POLYETHYLENE MATERIAL
- HEAT SEALING REQUIRED — LABOR INTENSIVE
- AUTOMATION POSSIBLE
- CONVENTIONAL ASSEMBLY — LABOR INTENSIVE
- DIE CASTING REQUIRED
- CLOSE TOLERANCES (MOTOR BLOWER)
- MULTIPLE DISCIPLINES

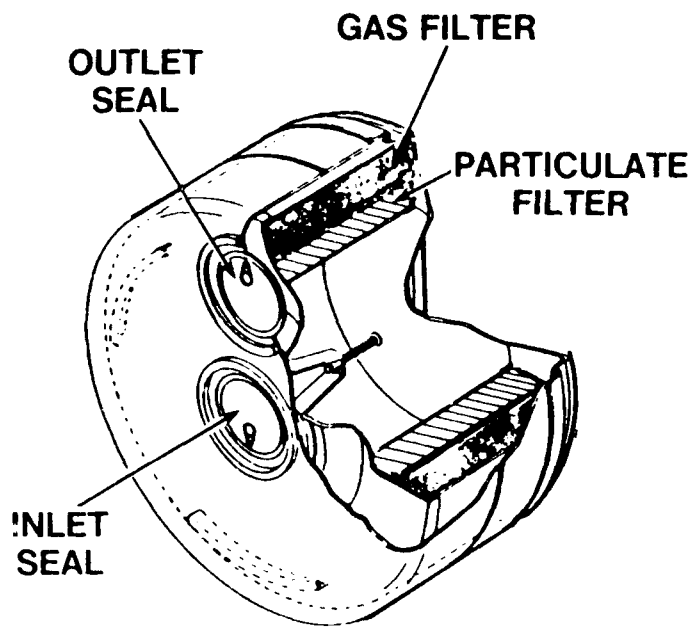
POINTS OF CONTACT

TECHNICAL: Mark Diglio, (301) 671-5759

ADMIN: Susan K. Luckan, (301) 671-2031

AO332-W9 0038-10

HERMETICALLY SEALED FILTER CANISTERS FOR SCPE



CONTRACT/PROCUREMENT INFORMATION

CONTRACT: HERMETICALLY SEALED FILTER CANISTER

RFP: AUG 89

PROCUREMENT:	FY89-90	FY91-FY95
DOLLAR AMOUNT:	<$2M	<$4M

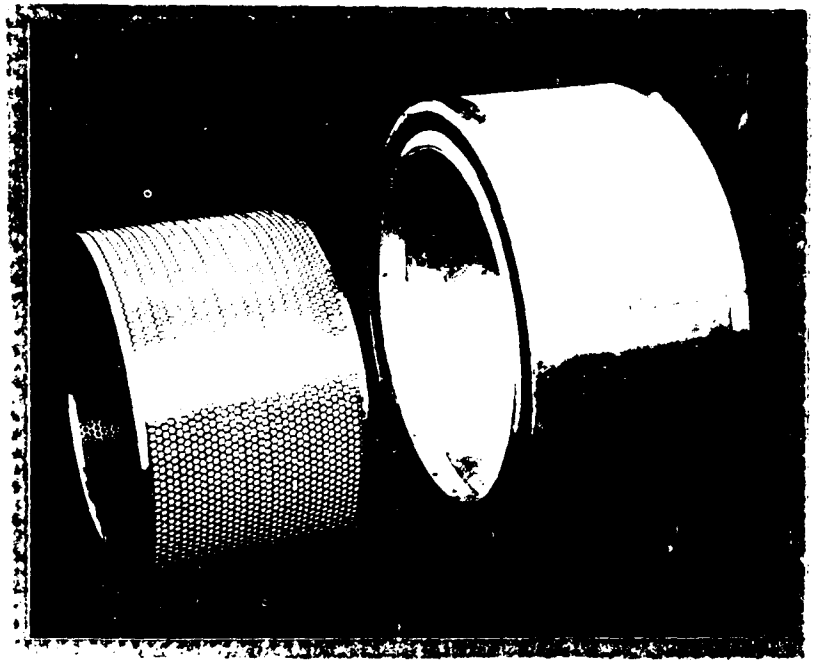
PRODUCTION OPPORTUNITIES/CHALLENGES

- SPECIAL ASSEMBLY TECHNIQUES
- LARGE TOOLING INVESTMENT
- FILTER CONSTRUCTION REQUIRES SKILLED LABOR
- SPECIAL TEST PROCEDURES

POINTS OF CONTACT

TECHNICAL: Mark Diglio, (301) 671-5759
ADMIN: Susan K. Luckan, (301) 671-2031

STANDARD FILTER SET (G&P) FOR MCPE



200 CFM GAS & PARTICULATE FILTERS

CONTRACT/PROCUREMENT INFORMATION

CONTRACT: STANDARD FILTER SET, GAS PARTICULATE

RFP: AUG 89

PROCUREMENT: FY89 FY90-FY95

DOLLAR AMOUNT: < $500K $3.5M

POINTS OF CONTACT

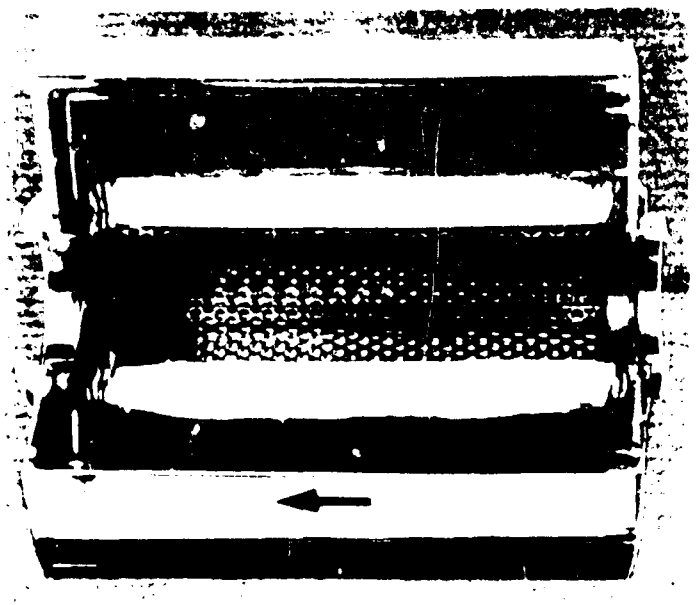
TECHNICAL: Adolfo R. Negron, (301) 671-5682
Mark A. Diglio, (301) 671-5759

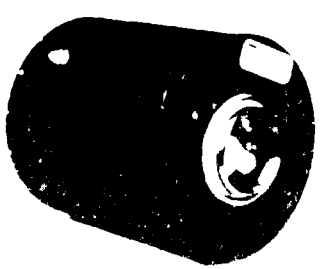
ITEM MGR: Jeff Havenner, (309) 782-5455

ADMIN: Susan K. Luckan, (301) 671-2031

AO332 W9 0038 12

M48 FILTER, NBC, GAS PARTICULATE





M48 FULL UP FILTER

M48 PACKAGED

CONTRACT/PROCUREMENT INFORMATION

CONTRACT: M48, 100 CFM, NBC, GAS PARTICULATE FILTER

RFP: DEC 89

PROCUREMENT: FY90 FY91-FY95

DOLLAR AMOUNT: < $600K < $3.5M

PRODUCTION OPPORTUNITIES/CHALLENGES

- SPECIAL ASSEMBLY TECHNIQUES
- FILTER CONSTRUCTION REQUIRES SKILLED LABOR
- SPECIAL TEST PROCEDURES
- TOOLING INVESTMENT

POINTS OF CONTACT

TECHNICAL: Gregory Mrozinski, (301) 671-5755

ITEM MANAGER: Cindy Tharp, (301) 671-5757

ADMIN: Susan K. Luckan, (301) 671-2031

AO332-W9 2248-09

COLLECTIVE PROTECTION

SUMMARY OF CONTRACTOR OPPORTUNITIES

YEAR	TITLE	AMOUNT	POINT-OF-CONTACT
FY90-FY95	MODULAR COLLECTIVE PROTECTION EQUIPMENT	TBD	JEFF HAVENNER (309) 782-5455
FY90-FY95	STANDARD FILTER SET, GAS AND PARTICULATE	<$3.5M	JEFF HAVENNER (309) 782-5455
FY90-FY95	HERMETICALLY SEALED FILTER CANISTER	<$6.0M	MARK DIGLIO (301) 671-5759
FY91-FY95	COLLECTIVE PROTECTION EQUIPMENT, NBC, SIMPIFIED, M20A1	<$25M	MARK DIGLIO (301) 671-5759
FY90-FY95	M48, 100 CFM, NBC, GAS-PARTICULATE FILTER	<$4.1M	CINDY THARP (309) 782-5757
FY92	HIGH PRESSURE NBC FILTER	<$0.4M	BRYAN HILD (301) 671-5763

AO332-W9 0038-14

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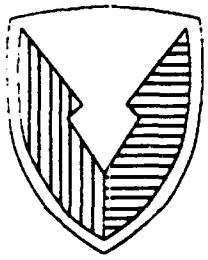


U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

DECONTAMINATION SYSTEMS

by

MR. R. BUCCI/DR. J. BAKER

Physical Protection Directorate

SMCCR-PPD
AREA CODE (301) 671-5625/5621
AUTOVON (584) 5625/5621

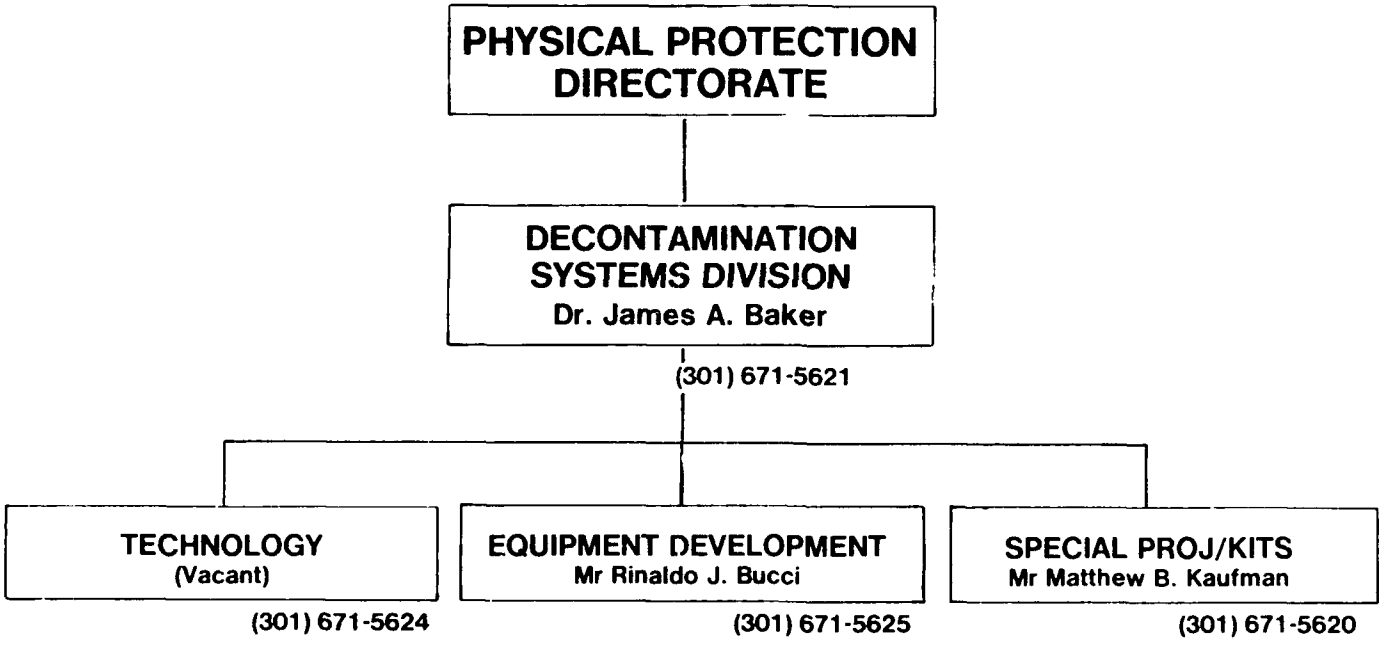
AO332-C-C9-224957

DECONTAMINATION EMPHASIS

- ELIMINATE NUCLEAR-BIOLOGICAL-CHEMICAL HAZARDS ON THE BATTLEFIELD
  - DECONTAMINATE ALL AGENTS
    - INTEGRATE WITH DETECTION TECHNOLOGIES
      - REDUCE LOGISTICAL BURDEN & WATER DEPENDENCY
        - REDUCE TIME IN PROTECTIVE CLOTHING
          - DEVELOP DECONTAMINANTS/EQUIPMENT TO SUPPORT THE SOLDIER
            - STREAMLINE AQUISITION AND FIELDING OF EQUIPMENT

A0332-X9 3257-01

DECONTAMINATION



AO332-X9 0257-04

SMCCR Form 38, 1 April 1985

DECONTAMINATION EFFORTS OBJECTIVES

FM 3-5
NBC DECON

PROVIDING:

BASIC SOLDIER SKILLS → LIFE SAVING

- LIGHT WEIGHT, LOW BULK ITEMS
- MAINTAIN SOLDIER COMBAT EFFECTIVENESS

HASTY → SUSTAIN MISSION

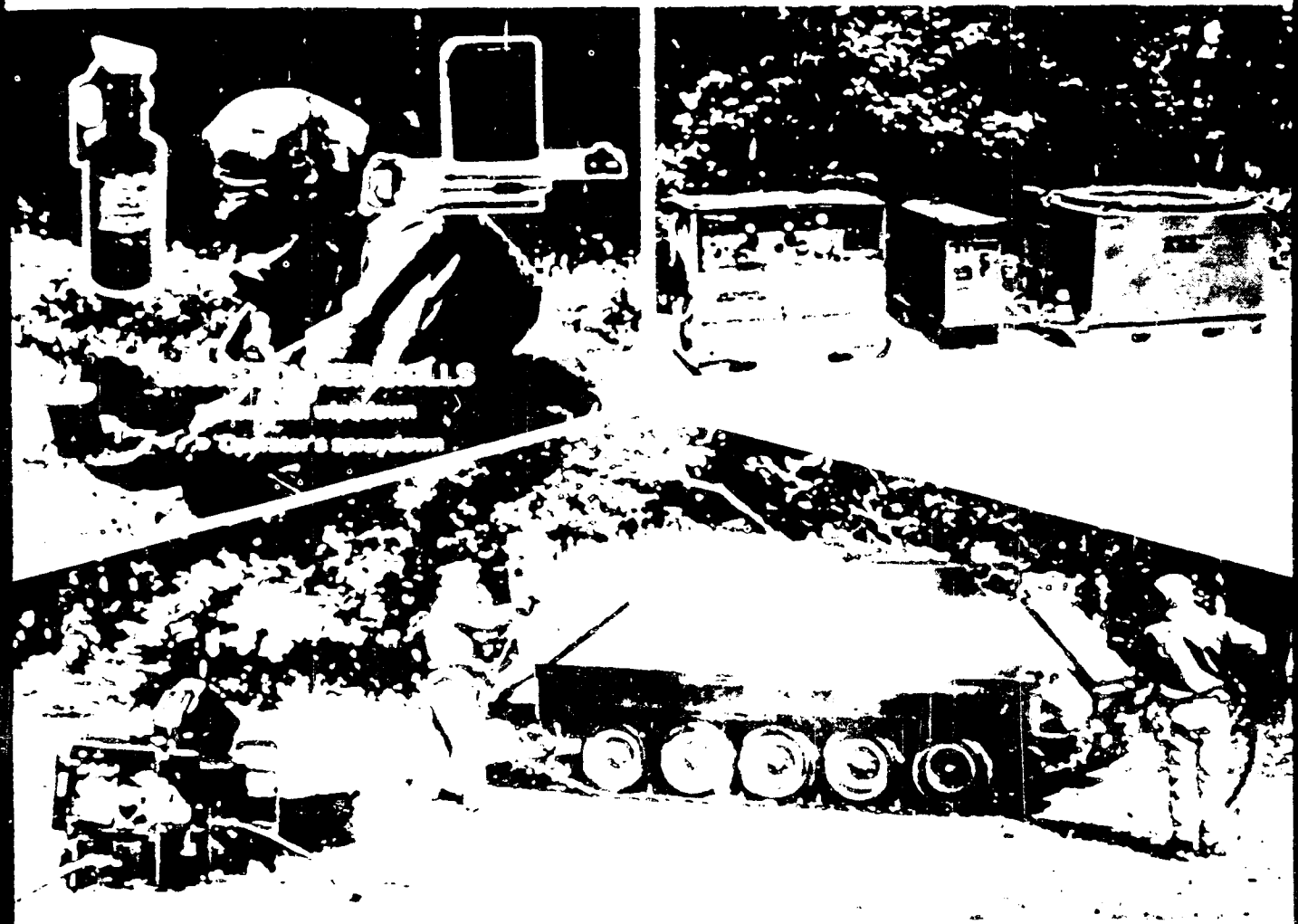
- REDUCE HAZARD/CONTAMINATION SPREAD
- ALLOW SOME MOPP RELIEF

DELIBERATE → REDUCE MOPP

- REDUCE HAZARD TO NEAR NEGLIGIBLE LEVEL
- SIGNIFICANTLY REDUCED MOPP LEVEL

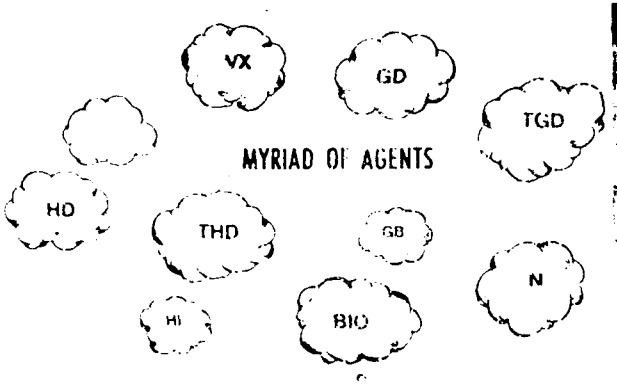
A0332- LL8 2766-01

DECONTAMINATION

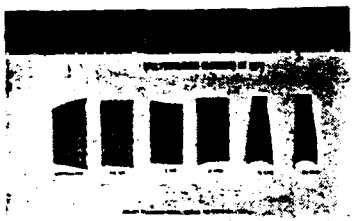


LEVELS OF DECON (FM 3-5)

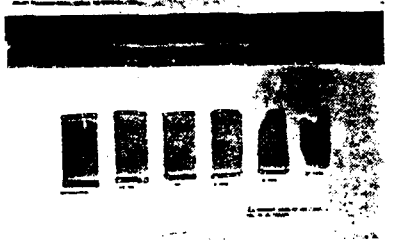
TECHNICAL CHALLENGES OF DECON

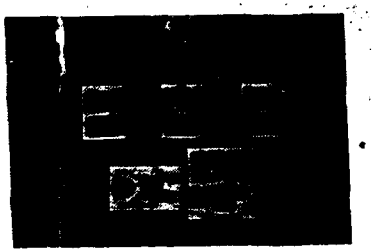


MYRIAD OF AGENTS

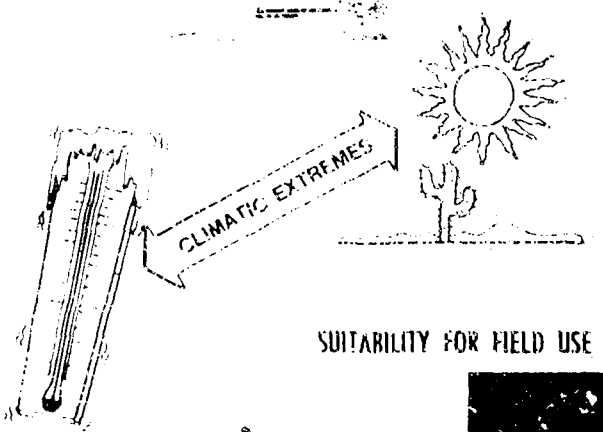


MATERIAL COMPATIBILITY

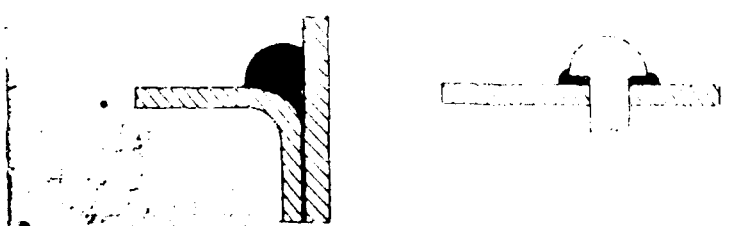




AGENT SUBSTRATE INTERACTIONS



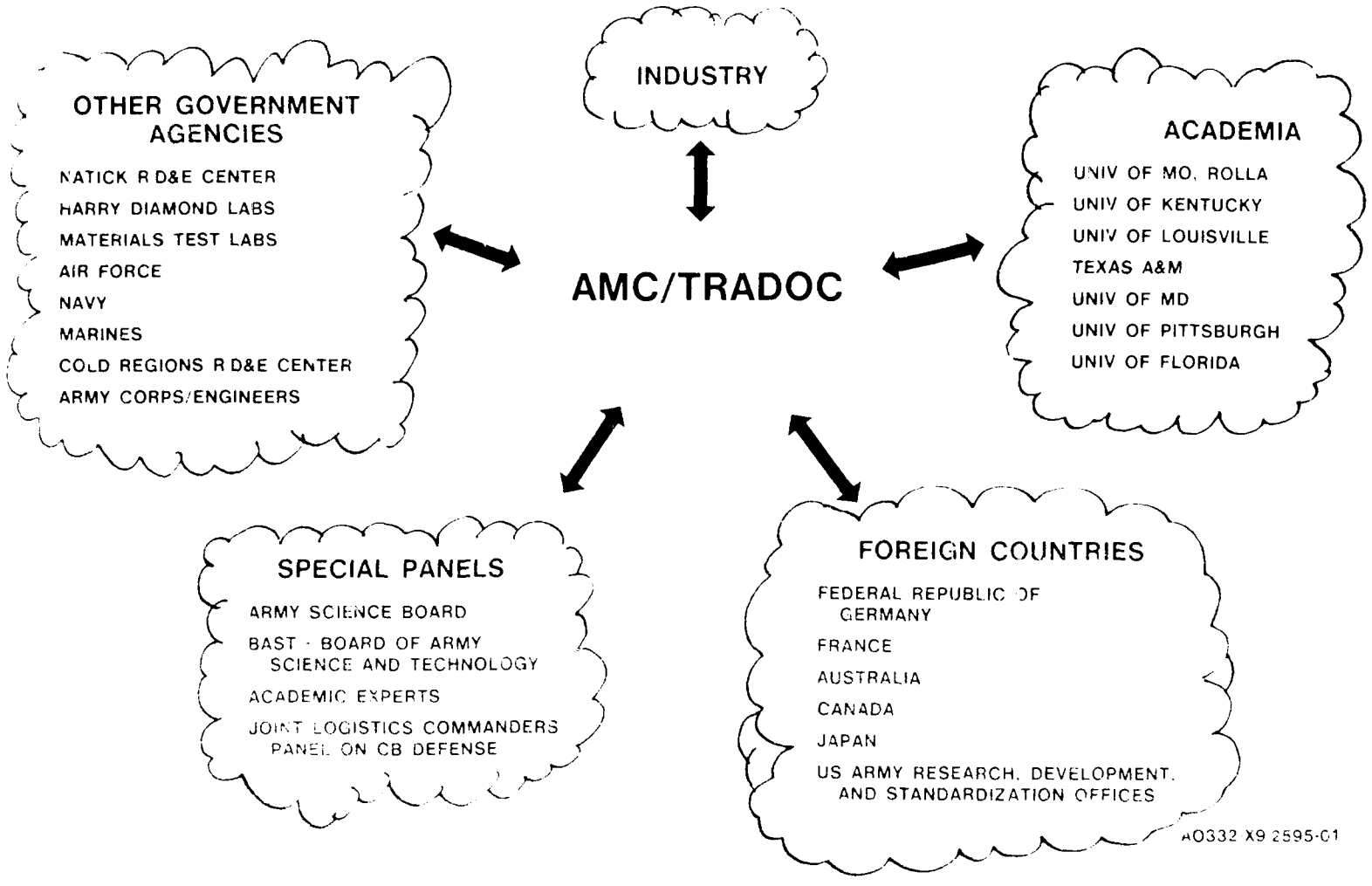
SUITABILITY FOR FIELD USE



INCREASED SOPHISTICATION IN LABORATORY

INCREASED SIMPLICITY OF USE

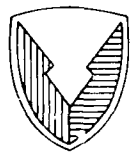
KEY PLAYERS IN DECONTAMINATION



AO332 X9 2595-01

SMCCR Form 38, 1 April 1985

IMPLEMENTATION OF THE DECON MASTER PLAN



- BEGIN WORK ON A SORBENT SYSTEM FOR BASIC SOLDIER SKILLS DECON.
  - INITIATE HETEROGENOUS CATALYSIS STUDIES TO ADD REACTIVITY.
- SELECT NONREACTIVE COATING SYSTEM FOR HASTY OPERATIONS.
  - EXPAND HETEROGENOUS CATALYSIS WORK FOR USE IN FILMS AND COATINGS.
- CONTINUE WATER BASED EMULSION WORK FOR DELIBERATE DECON.
  - IMPROVE TO FULLY CATALYTIC SYSTEM THROUGH HETEROGENOUS STUDIES.
- EXPAND TO JOINT SERVICE APPLICABILITY.

A0332-Z7 1480-03

DECONTAMINATION

TECHNOLOGY PLANS, 6.2 FY 90/91

TASK/DESCRIPTION	DOLLARS (K)	DATE	TECHNICAL POC
● FEASIBILITY DEMONSTRATION OF AUTO RELEASE COATING HARDWARE	< $ 350	2QFY90	J. Richmond 301-671-5640 (CRDEC)
● EVALUATE AUTORELEASE PROPERTIES OF SACRIFICIAL COATINGS	< $ 100	2QFY90	J. Richmond 301-671-5640 (CRDEC)
● EVALUATE DECON EFFICACY OF SACRIFICIAL COATINGS	< $ 100	2QFY90	J. Richmond 301-671-5640 (CRDEC)
● QUICK TEST NO.2	< $ 50	1QFY90	L. Kanaras 301-671-5647 (CRDEC)
TOTAL	$600		

AO332-X9 0257-03

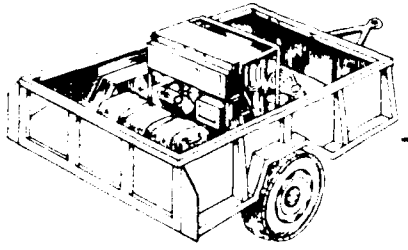
DECONTAMINATION

DEVELOPMENT PLANS, FY90/91

TASK/DESCRIPTION	DOLLARS (K)	DATE	TECHNICAL POC
● MODULAR DECON SYSTEM	< $ 4,000	1QFY90	S. Harlacker 301-671-5646 (CRDEC)
● XM19 NONAQUEOUS EQUIP DECON SYSTEM (NAEDS)	< $ 4,000	2QFY90	J. Daniel 301-671-5934 (CRDEC)
● MOBILE NAEDS	< $ 7,000	4QFY90	K. Shetterly 301-671-5654 (CRDEC)
● DECONTAMINATING AGENT: MULTIPURPOSE	< $ 200	1QFY90	W. Shewchuk 301-671-5634 (CRDEC)
● DECONTAMINATING AGENT: MULTIPURPOSE	< $ 2,500	1QFY91	W. Shewchuk 301-671-5634 (CRDEC)
	TOTAL $ 17,700		

AO332-X9 0257-01

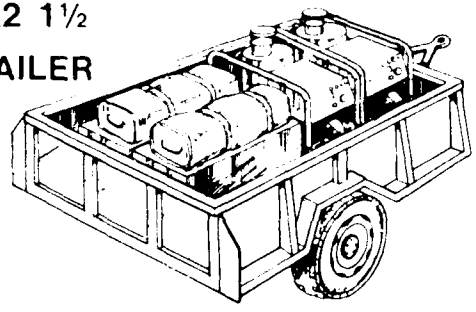
MODULAR DECON SYSTEM (MDS)



M101A2 3/4 TON TRAILER

AND

M105A2 1½ TON TRAILER



PROVIDES

- FOR DECONTAMINATION OF VEHICLE/AIRCRAFT EXTERIORS

SYSTEM CONFIGURATION:

- DS2 APPLICATOR/SCRUBBER MODULE
- HIGH PRESSURE WASHER MODULE
- CONTINUOUS DECONTAMINANT MIXER

ASIOE:

- M17 LIGHTWEIGHT DECON SYSTEM
- 3000 GALLON COLLAPSIBLE TANK
- 65 GPM PUMPS W/HOSES/NOZZLES/ FILTERS
- FIRE HYDRANT ADAPTER KIT
- M101A2 ¾ TON TRAILER
- M105A2 1½ TON TRAILER

DESCRIPTION/USE:

- HIGH PRESSURE/HOT WATER FOR PRIMARY WASH AND RINSE STEPS
- MIXES/DISPENSES NBC DECONTAMINANTS
- USED FOR DELIBERATE/HASTY DECON

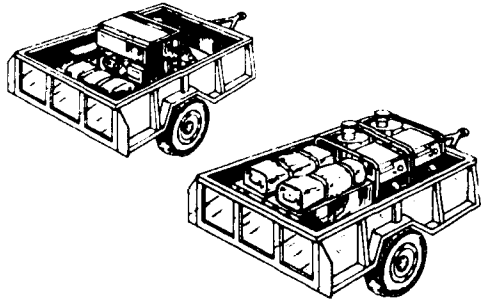
PHASE:

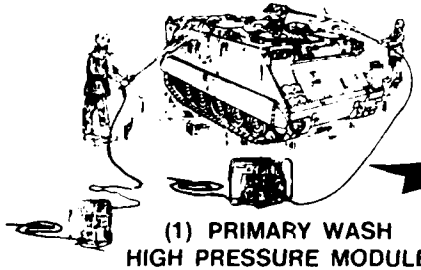
- PROOF OF PRINCIPLE
- P^3I PLANNED - COMBINE MODULES

AO332-T9 1387-01

MODULAR DECON SYSTEM (MDS)
CONCEPT OF USE

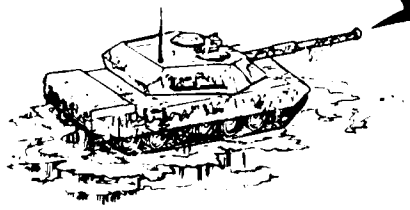
DECON PLATOON
(DELIBERATE DECON)



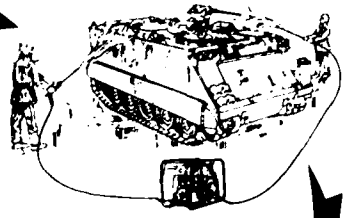


(1) PRIMARY WASH
HIGH PRESSURE MODULE
M17 LDS

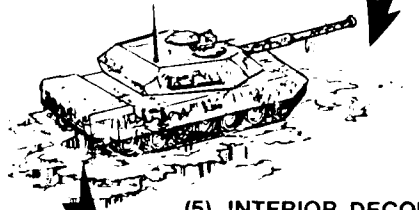
(2) DECONTAMINANT APPLICATION
DS2 PUMP/SCRUBBER
CONTINOUS MIXER



(3) WAIT/REACTION TIME



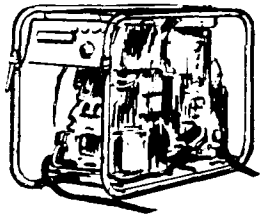
(4) RINSE M17 LDS



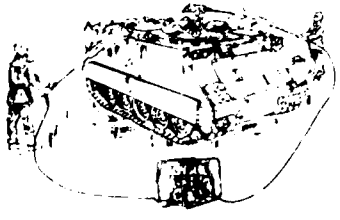
(5) INTERIOR DECON

(6) DETECTION CHECK

M17 LDS



LINE UNITS
(HASTY DECON)



WATER

FABRIC TANK

NATURAL SOURCE

65 GPM PUMP

AO332-M8 0636-01

SMCCR Form 38, 1 April 1985

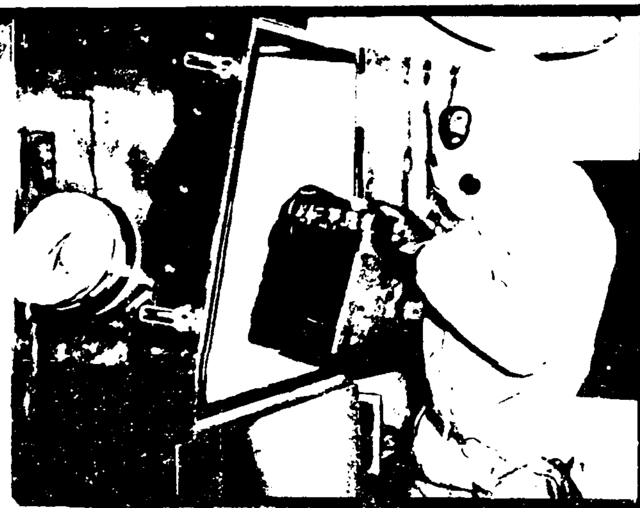
NONAQUEOUS EQUIPMENT DECONTAMINATION SYSTEM (NAEDS)

- PROJECT:
  - NAEDS, FIXED SITE, XM19
- KEY REQUIREMENTS:
  - REMOVE NBC CONTAMINATION FROM EQUIPMENT DESIGNED IAW AR70-71
  - CONTROL RESIDUAL CONTAMINATION AND/OR WASTE
  - PURIFY/RECYCLE SPENT SOLVENT
- DESCRIPTION/USE:
  - CLOSED CHAMBER WITH ACCESS VIA GLOVE PORTS FRONT AND REAR; ENTRY/EXIT DOORS AT ENDS
  - SEPARATE CONTROL AND POWER MODULES
  - PRESSURE SPRAY AND IMMERSION BATH OF CHLOROFLUOROCARBON (FREON®113)
  - SOLVENT NEUTRALIZATION WITH CAUSTIC SOLUTION, STATIC MIXER, AND PARTICULATE FILTER
  - USED FOR DECONTAMINATION OF AVIONICS, OPTICS, AND COMMUNICATION EQUIPMENT
- PHASE:
  - PROOF OF PRINCIPLE TO TYPE CLASSIFICATION
  - P^3I, SOLVENT PROCESSING

AO332-JJH 2459-01

NONAQUEOUS DECONTAMINATION

- SAFE DECON OF ELECTRONICS, OPTICS, & WEAPONS
- EFFECTIVE NBC DECONTAMINATION
- FIXED AND MOBILE SYSTEMS



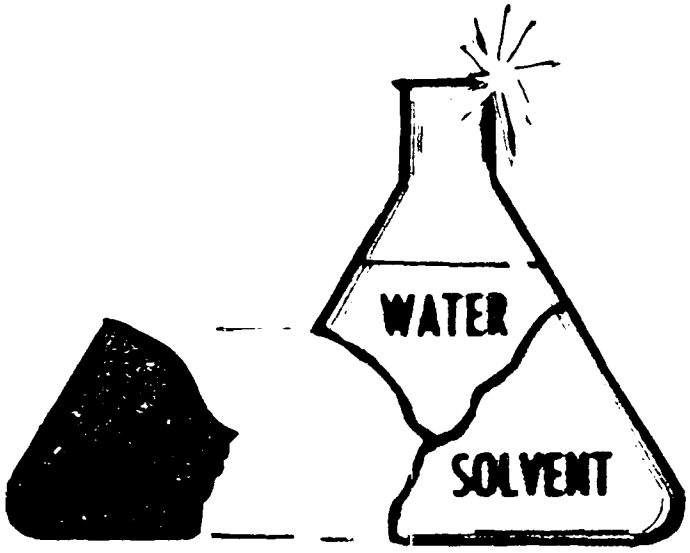
IMMERSION SYSTEM

SOLVENT SPRAY SYSTEM

JOINT ARMY/AIR FORCE DEVELOPMENT

A0332- LL7 2192-01

DECONTAMINATION AND CONTAMINATION AVOIDANCE



ITEM:

- DECONTAMINATING AGENT: MULTIPURPOSE (DAM)

DESCRIPTION:

- DECON EFFICACY EQUAL/BETTER THAN DS2, STB AGAINST THREAT CML/BIO AGENTS
- DELIBERATE DECONTAMINATION AT EQUIPMENT DECON STATION (EDS)
- LESS CORROSIVE, MORE LOGISTICALLY SUPPORTABLE THAN DS2, STB
- CAPABLE OF FORMATION/APPLICATION WITH CONTINUOUS MIXER
- LOGISTICS IMPROVEMENT BY REPLACEMENT OF REACTIVE COMPONENT(S) WITH CATALYSTS (P^3I)

KEY TECHNOLOGIES:

- MICROEMULSION
- HOMOGENEOUS CATALYSIS

PHASE:

- TRANSITION TO FULL SCALE ENGINEERING DEVELOPMENT IN 1990

AO332-X9 2284-01

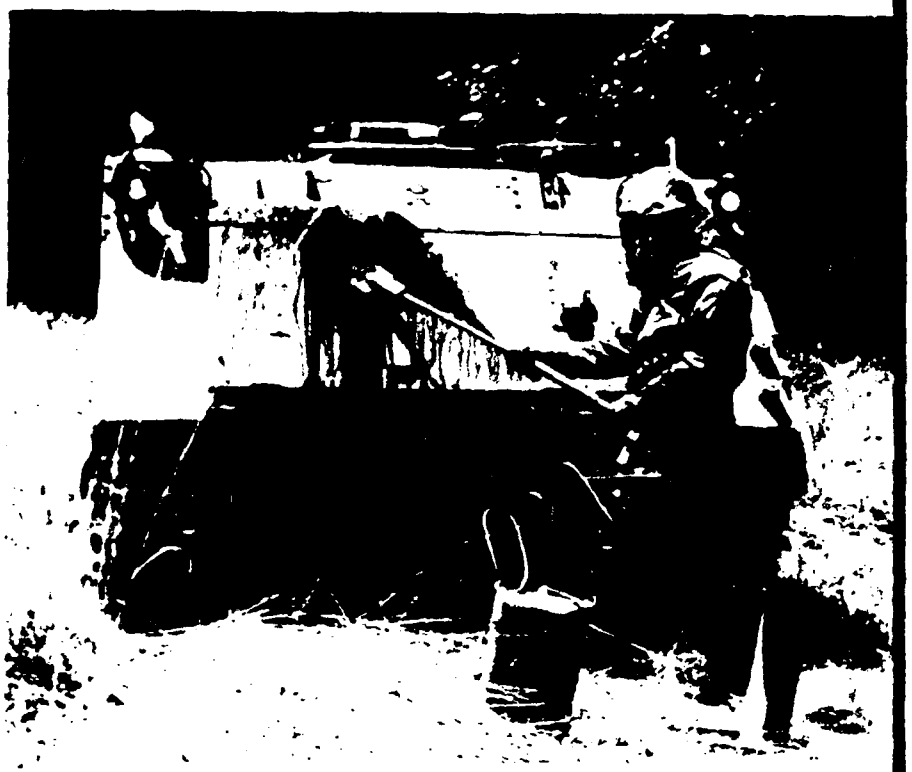
DECONTAMINATION

PRODUCTION PLANS, FY90/91

TASK/DESCRIPTION	DOLLARS (K)	DATE	TECHNICAL POC
● M13 DECON APPARATUS	< $ 7,000	3QFY90	M. Sadowski 301-671-5908 (CRDEC) A. Gisel 309-782-3111 (AMCCOM)
● XM291 SKIN DECON KIT	< $ 8,000	3QFY90	J. Szalajda 301-671-5680 (CRDEC) I. Hudson 309-782-3262 (AMCCOM)
● M17 LIGHTWEIGHT DECON SYSTEM	< $ 12,200	3QFY90	R. Muellerschoen 301-671-5698 (CRDEC) S. Langley 309-782-3262 (AMCCOM)
TOTAL	$ 27,200		

AO332-X9 2274-02

DECONTAMINATION



ITEM:

M13 DECONTAMINATING APPARATUS

DESCRIPTION:

THE M13 CONSISTS OF A 14 LITER PREFILLED DS2 CONTAINER, A MANUALLY OPERATED SPRAY HOSE, TWO WAND SECTIONS, BRUSH AND ACCESSORY STORAGE CONTAINER. AN UNFILLED BLACK CONTAINER IS AVAILABLE FOR TRAINING

USE:

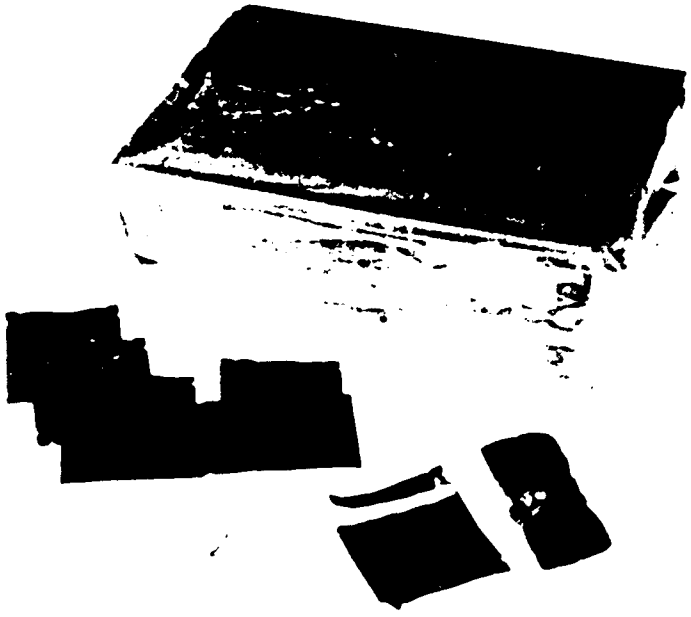
THE M13 IS USED BY THE OPERATOR OF THE PIECE OF EQUIPMENT ON WHICH IT IS MOUNTED TO REDUCE THE HAZARD OF CHEMICAL AGENTS ALLOWING NORMAL OPERATION AND MAINTENANCE

PHASE:

PRODUCTION

A0332- AA61889-03.01

XM291
SKIN DECONTAMINATION KIT



ITEM DESCRIPTION:

- REACTIVE RESIN AND PHYSICAL REMOVAL EFFECT DECONTAMINATION
- 20 KITS PER SQUAD CONTAINER; 6 PACKETS PER KIT
- 3 FULL DECON OPERATIONS PER KIT (DECON HANDS, FACE, NECK, AND MASK INTERIOR)

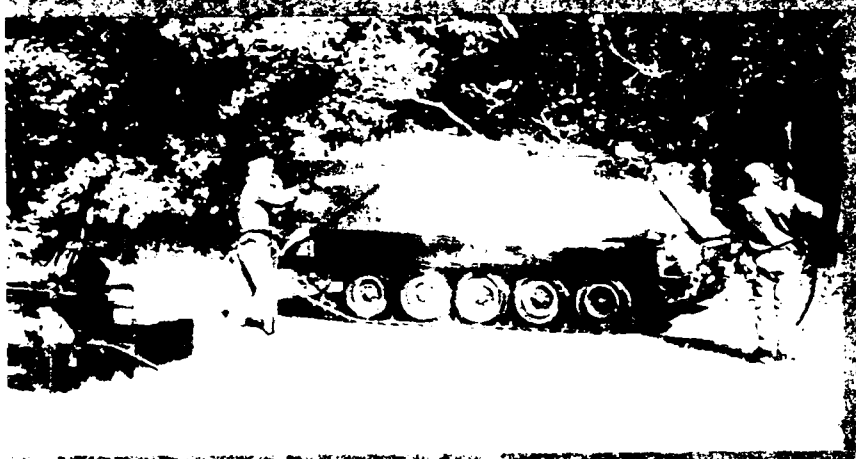
PHASE:

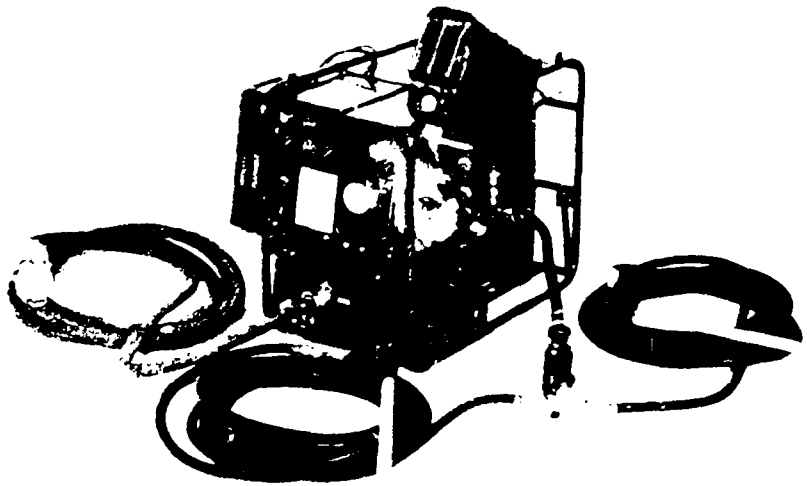
ENGINEERING DEVELOPMENT

ADOPTION:

1QFY90

LIGHTWEIGHT DECON SYSTEM
SANATOR





DECONTAMINATING APPARATUS: POWER DRIVEN, PORTABLE

DESCRIPTION/USE:

- PORTABLE 2-CYCLE ENGINE PUMP AND WATER HEATING UNIT. CAPABLE OF 100°M AND 120°C USED ON VEHICLE RINSE AND PERSONNEL SHOWERS
- ACCESSORY KIT WITH 35 FT SUCTION HOSE, TWO WANDS, AND 12 PERSON SHOWER SYSTEM
- COLLAPSIBLE BLADDER 1580 GAL CAPACITY

PHASE:

- PRODUCTION/DEPLOYMENT

DECONTAMINATION

CONTRACTOR OPPORTUNITIES

SUMMARY

CONTRACT TYPES	ESTIMATED VALUE	TIME FRAME
TECHNOLOGY	$ 600 K	FY 90/91
DEVELOPMENT	17,700 K	FY 90/91
PRODUCTION	27,200 K	FY 90/91
TOTAL	$45,500 K	

POC: Dr. James A. Baker (301) 671-5621

AO332-X9 2274-01

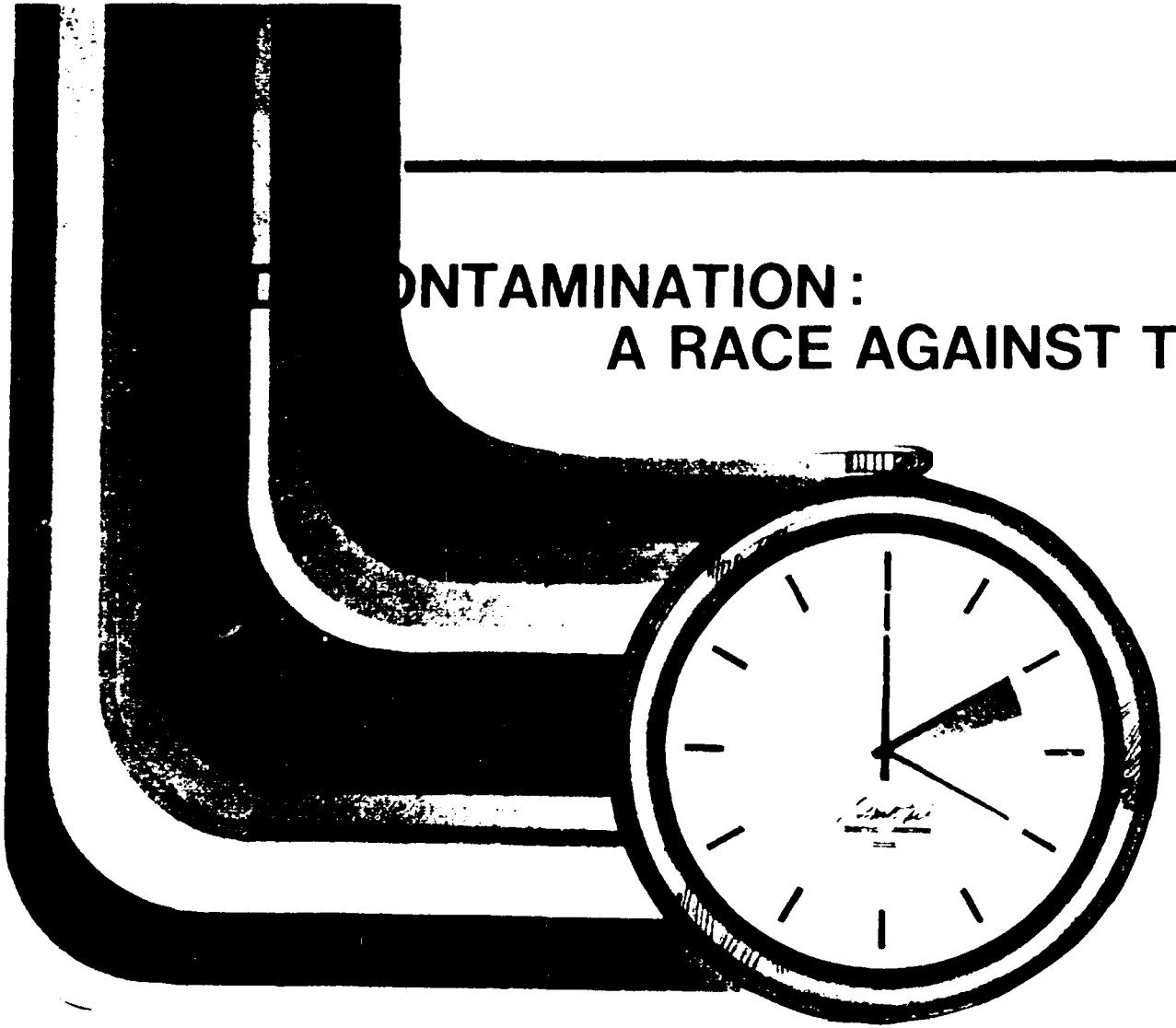
DECONTAMINATION

INNOVATIVE AREAS OF INTEREST

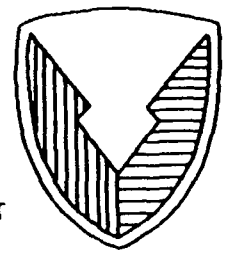
- AGENT-RESISTANT MATERIALS
  - NOVEL CHEMICAL DECONTAMINANTS FOR EQUIPMENT AND REDUCTION IN WATER DEPENDENCY
    - SAFE AND EFFECTIVE DECONTAMINANTS FOR THE INTERIOR OF COMBAT VEHICLES
      - CATALYTIC IMPROVEMENTS FOR SORBENTS, COATINGS AND EMULSIONS
        - NEW EFFECTIVE/PRACTICAL DECONTAMINATION AVOIDANCE MEASURES
          - DECONTAMINANTS AND/OR METHODS FOR AIRCRAFT EXTERIORS AND CARGO
            - IMPROVEMENTS IN LOGISTICS AND APPLICATIONS TO REDUCE LABOR INTENSIVE EFFORTS ON THE BATTLEFIELD

A0332 WW7 2903-01

ONTAMINATION:
A RACE AGAINST THE CLOCK



A0332-



U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

NBC CONTAMINATION SURVIVABILITY OF ARMY MATERIEL

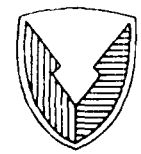
by

DR. W.S. MAGEE, JR.

SMCCR-NB
AREA CODE (301) 671-3420
AUTOVON (584) 3420

AO532-C-F120251

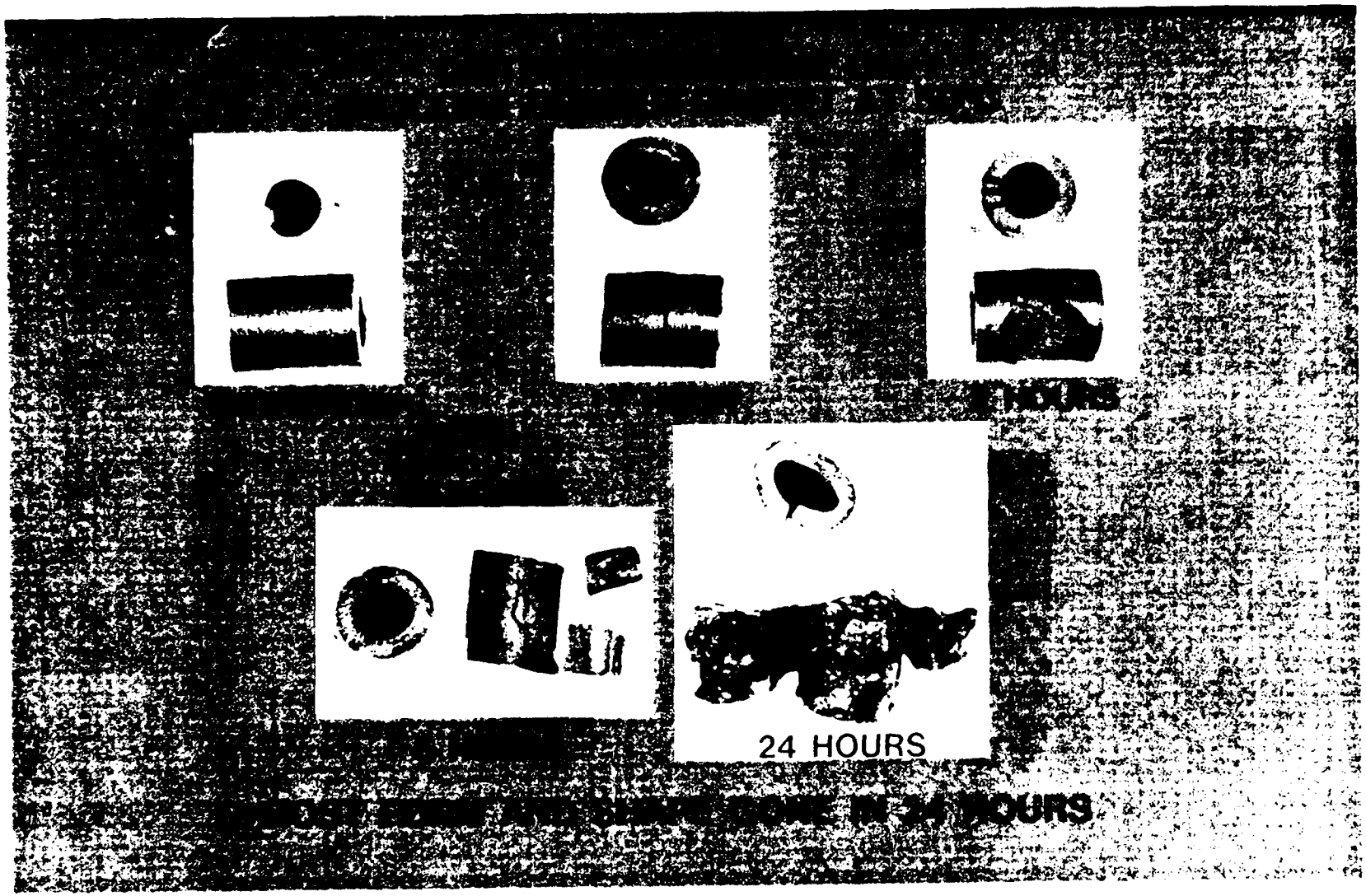
MATERIEL DEGRADATION



- CONTAMINATION/DECONTAMINATION AFFECTS MATERIALS
  - CHEMICAL PROPERTIES
  - MECHANICAL PROPERTIES
  - THERMAL PROPERTIES
  - ELECTROMAGNETIC PROPERTIES
- MATERIALS PROPERTIES DETERMINE FUNCTIONAL CHARACTERISTICS

AO332-VV7 2820-06

DECONTAMINATION EFFECTS

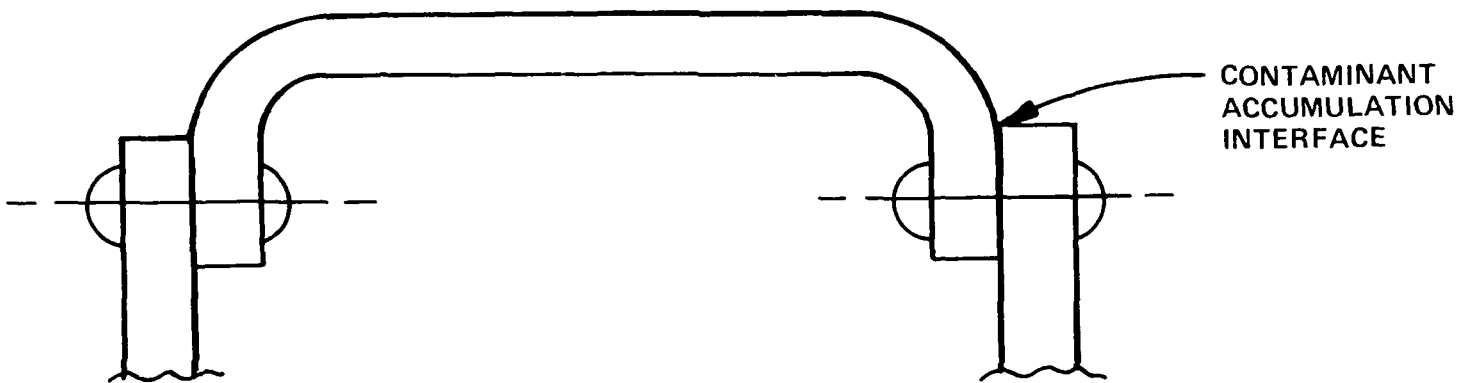


EQUIPMENT DESIGN CONCERNS

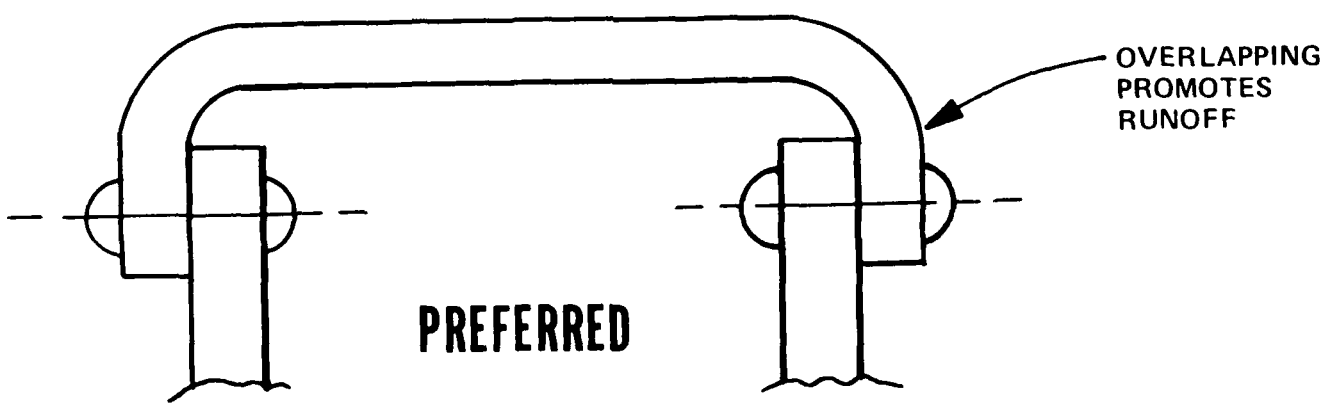
ENTRAPPED AGENTS AND DECONTAMINANTS

- CORROSION
- DESTRUCTION OF VITAL MATERIAL PROPERTIES
- RESIDUAL PERSONNEL HAZARD

CLOSURE, COVER/CAP DESIGNS



VS.



PREFERRED

PERFORMANCE DEGRADATION

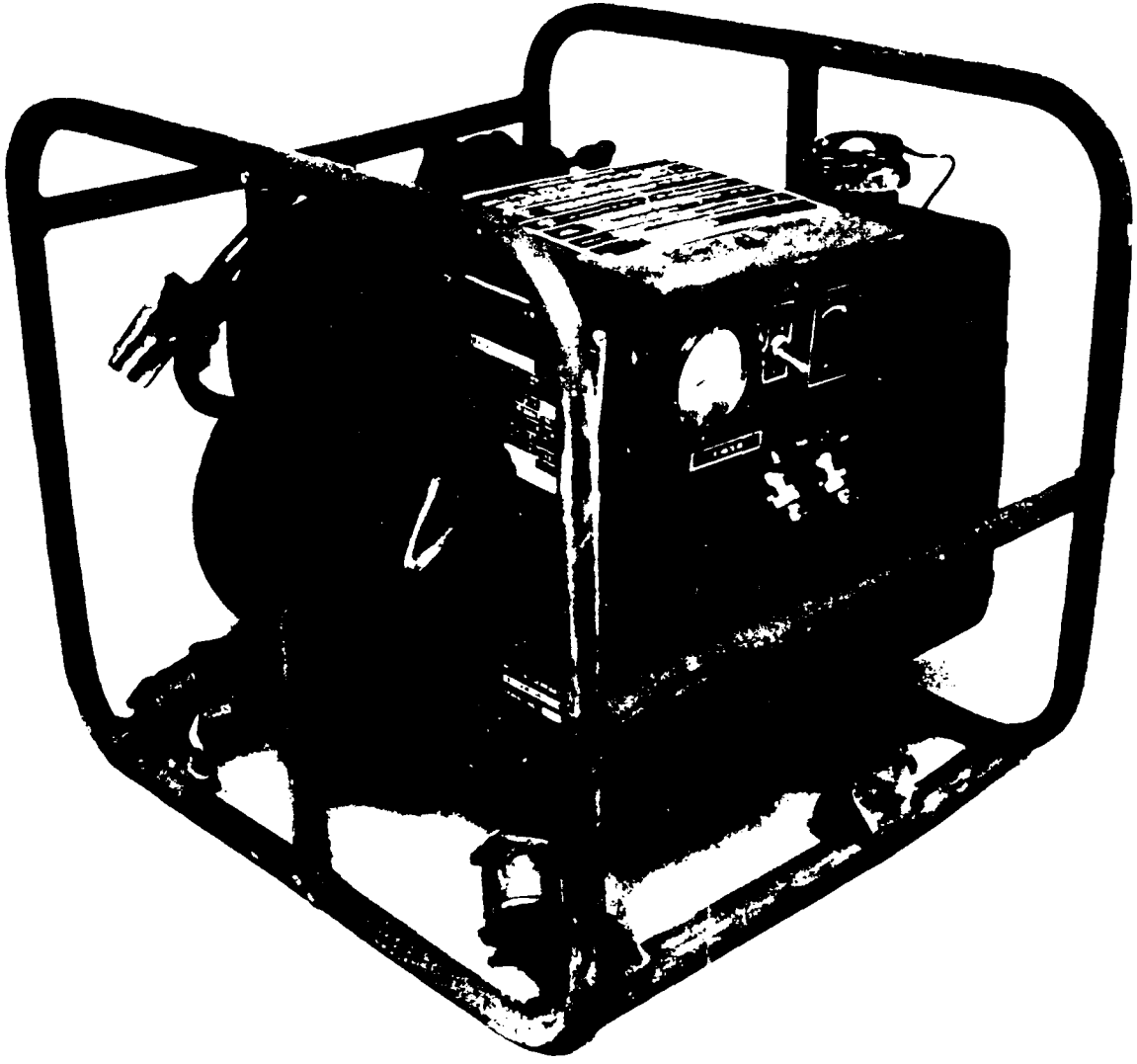
- PROTECTIVE ENSEMBLE AFFECTS PERFORMANCE

  "ENCAPSULATION" DECOUPLES PERSONNEL FROM ENVIRONMENT

  - MATERIALLY
  - MECHANICALLY
  - ORALLY
  - AURALLY

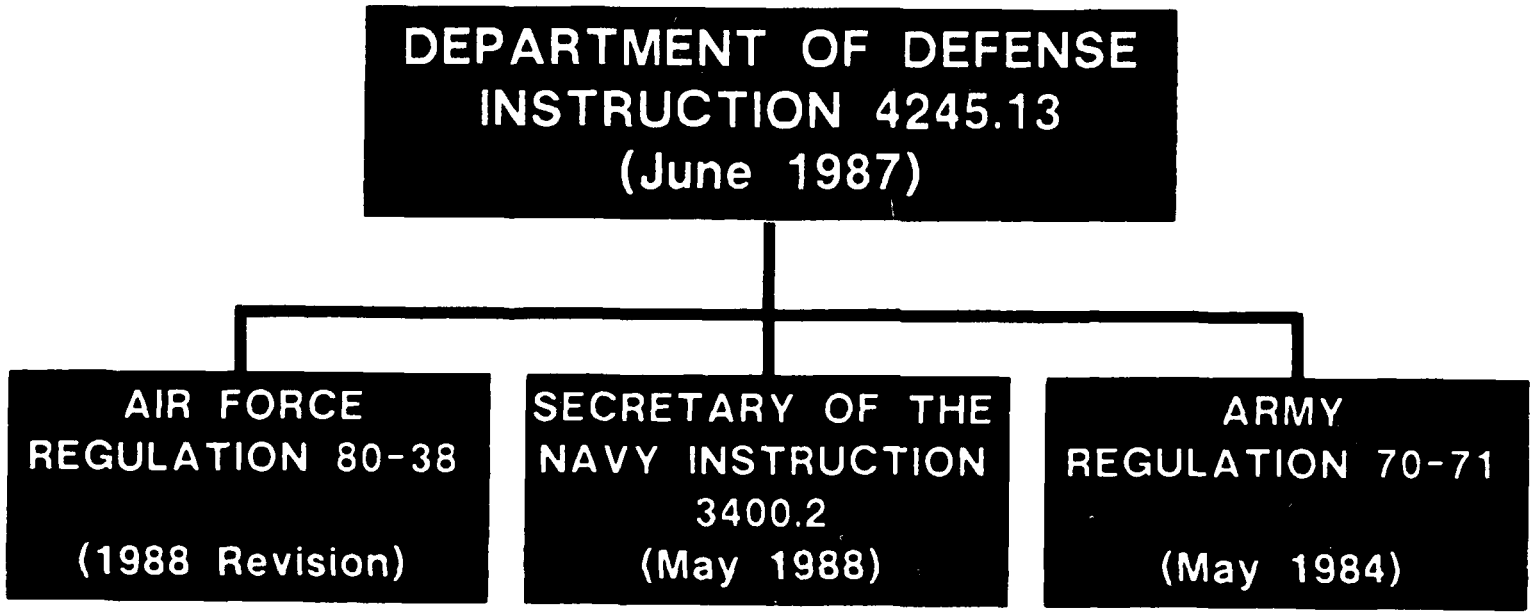
AO332-VV7 2820-07

0.5 Kw GENERATOR



AO332-T8 1285-01

NBC CONTAMINATION SURVIVABILITY



AO332-C-A9062254

MISSION EFFECTIVENESS

NBC DEFENSE ARCHITECTURE

INTEGRATED NBC DEFENSIVE SYSTEM

- DETECTION
- INDIVIDUAL PROTECTION
- COLLECTIVE PROTECTION
- CONTAMINATION CONTROL
- TRAINING
- MEDICINE

PERSONNEL ASPECTS

NBC CONTAMINATION SURVIVABILITY

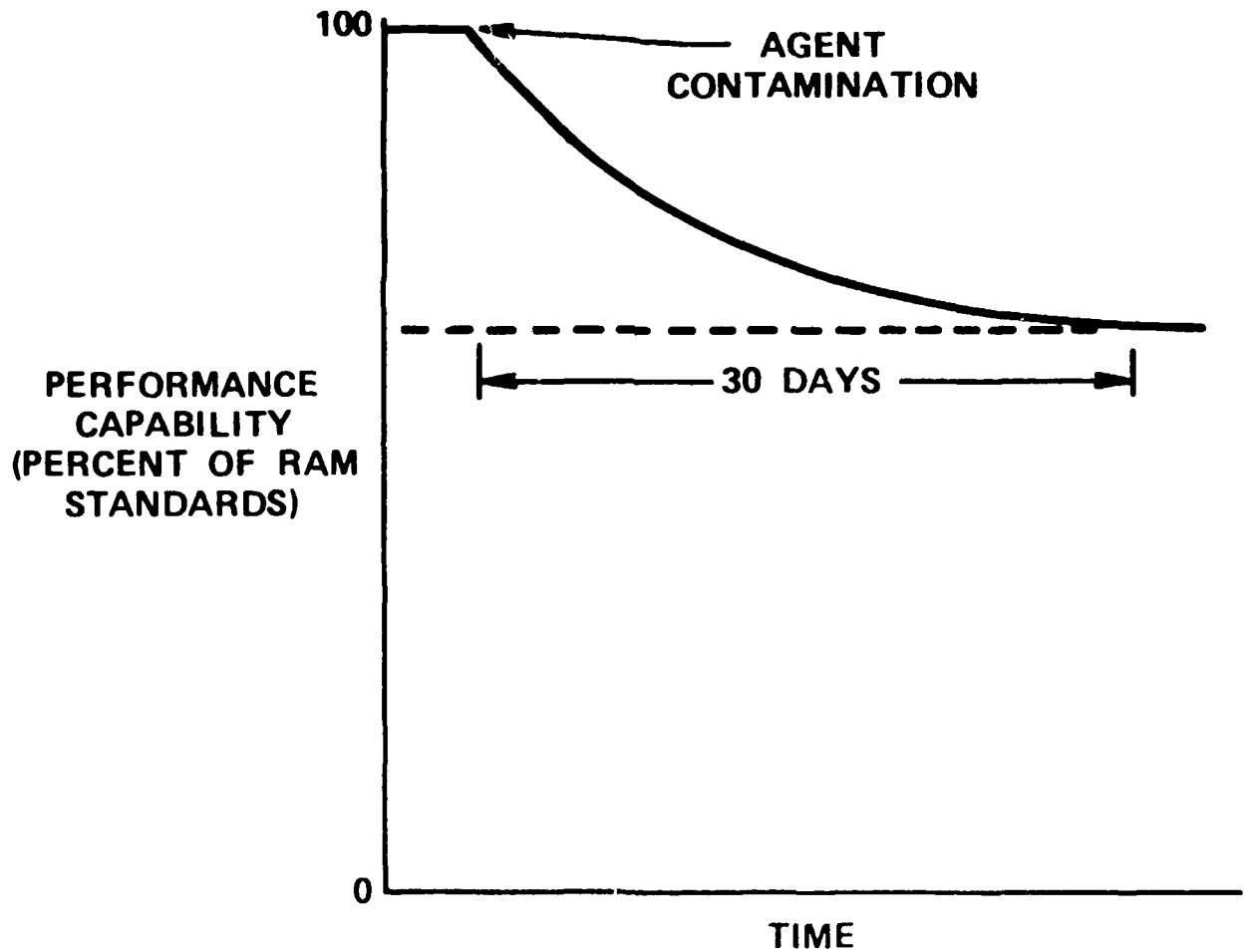
- HARDNESS
- DECONTAMINABILITY
- COMPATIBILITY

MATERIEL ASPECTS

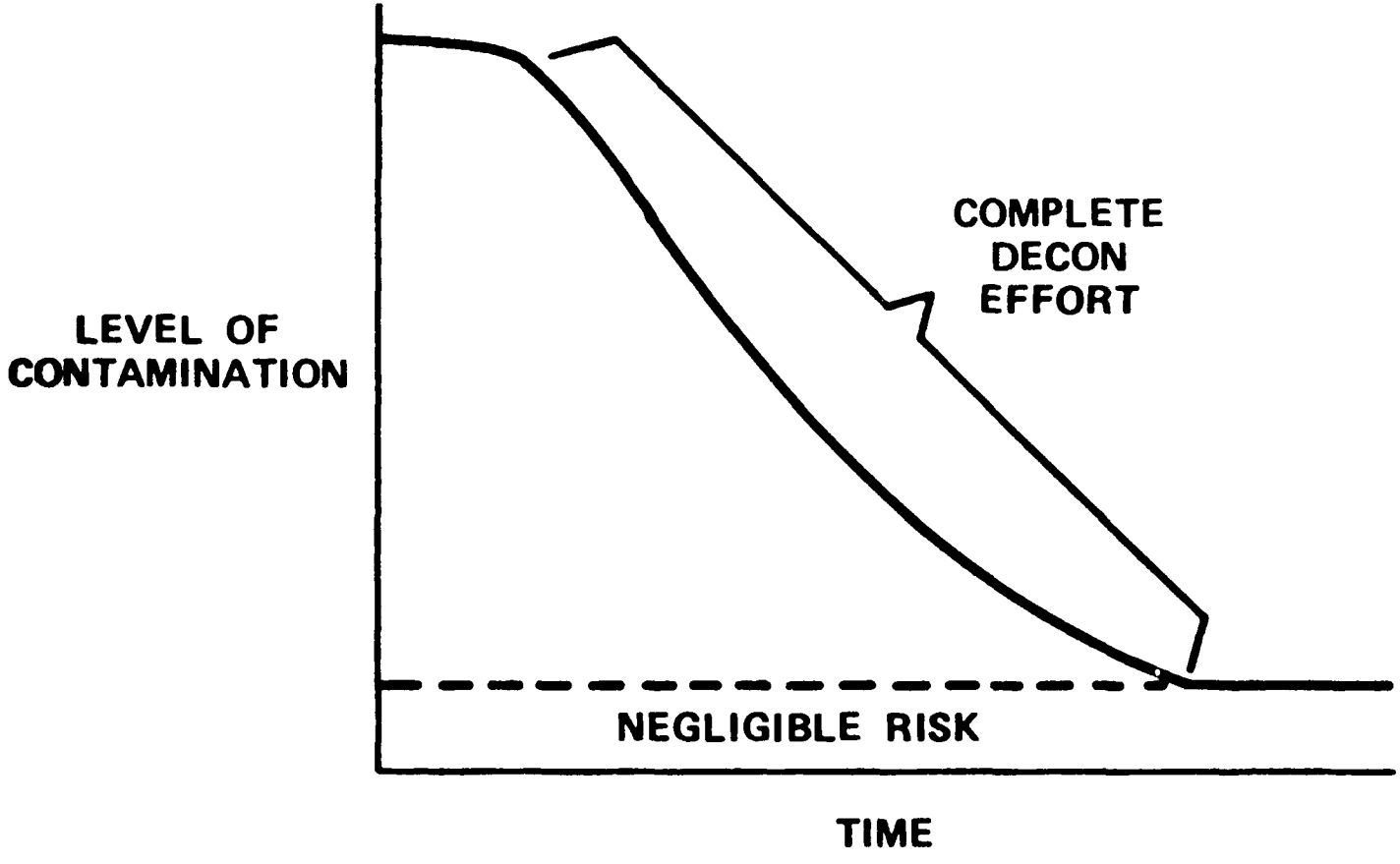
AO332-C-A9062256

VISUALIZATION OF THE HARDNESS STANDARD

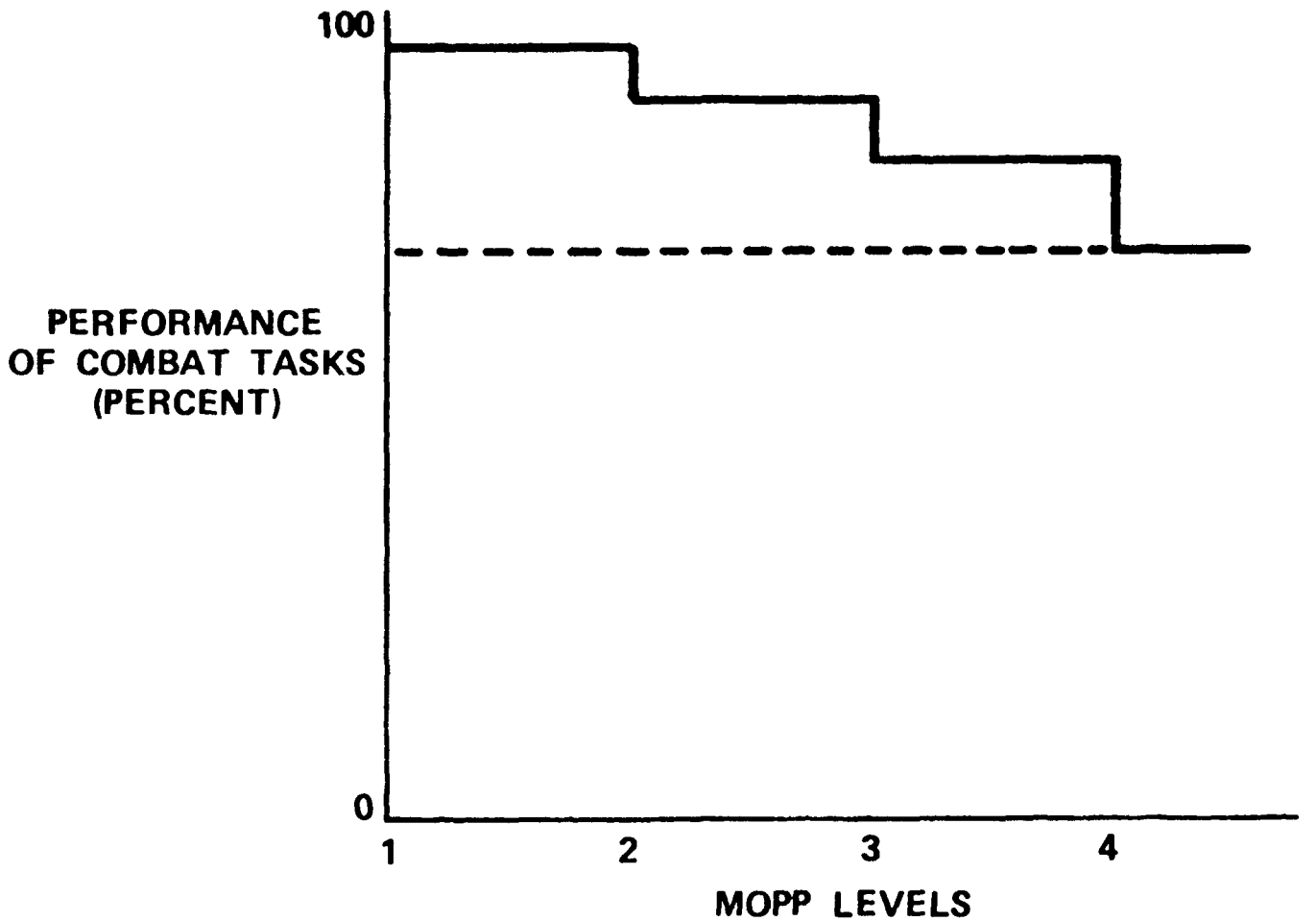
FOR CHEMICAL AGENTS



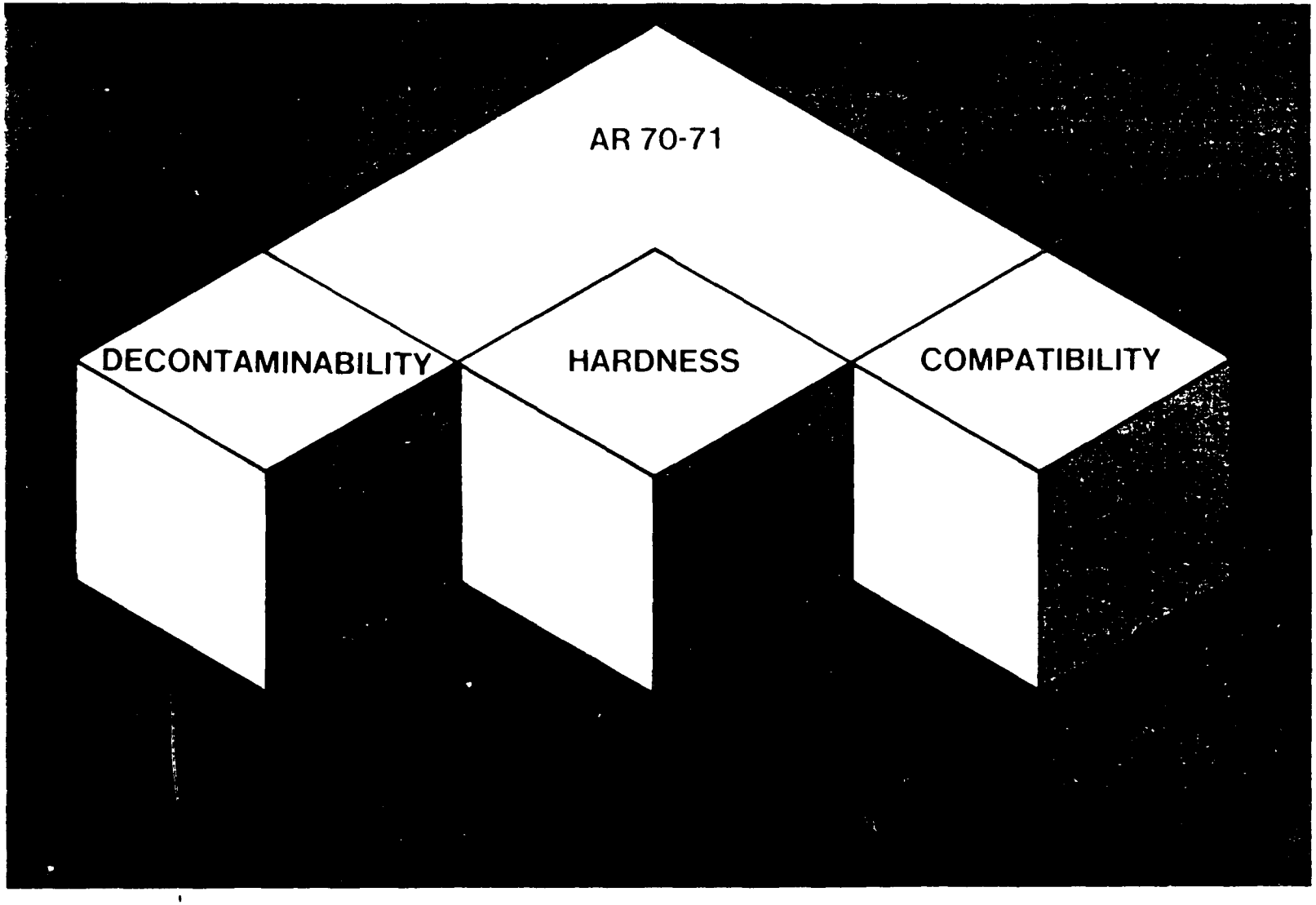
VISUALIZATION OF THE DECONTAMINABILITY STANDARD



COMPATIBILITY STANDARD



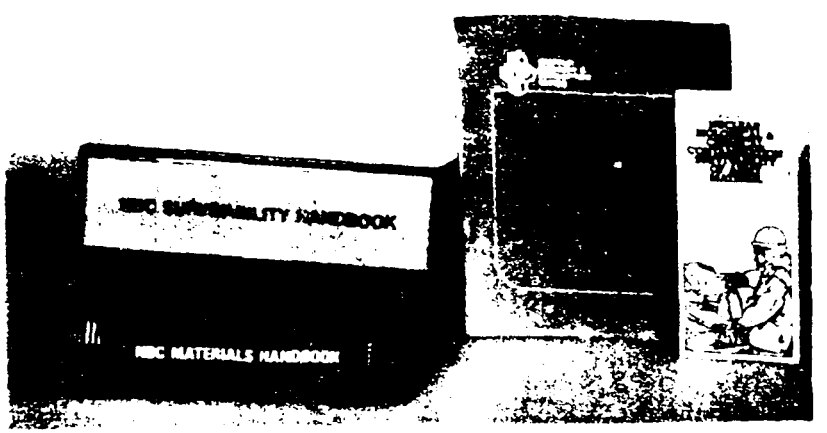
NBC SURVIVABILITY



NBC SURVIVABILITY GUIDANCE HANDBOOKS

AVAILABLE FROM THE DEFENSE TECHNICAL INFORMATION CENTER:

- NBC (NUCLEAR, BIOLOGICAL AND CHEMICAL) CONTAMINATION SURVIVABILITY: A HANDBOOK FOR DEVELOPMENT/MANAGEMENT OF MATERIEL PROGRAMS
  - DTIC NO. B098033
- GUIDELINES - DESIGN TO MINIMIZE CONTAMINATION AND TO FACILITATE DECONTAMINATION OF MILITARY VEHICLES AND OTHER EQUIPMENT: INTERIORS AND EXTERIORS
  - DTIC NO. A149088
- NBC MATERIALS HANDBOOK
  - DTIC NO. B079397



Nuclear, Biological, and Chemical Contamination Survivability (NBCCS)

William S. Magee, Jr.
U.S. Army Chemical Research, Development and Engineering Center
Aberdeen Proving Ground, MD 21010-5423

1. References:

a. Department of Defense Instruction 4245.13, Design and Acquisition of Nuclear, Biological, and Chemical-(NBC) Contamination-Survivable Systems, June 1987.

b. Air Force Regulation 80-38, Air Force Systems Surrvivability Program, (1989 revision).

c. Army Regulation 70-71, Nuclear, Biological, and Chemical Survivability of Army Materiel, May 1984.

d. Secretary of the Navy Instruction 3400.2, Design and Acquisition of Nuclear, Biological, and Chemical-(NBC) Contamination-Survivable Systems, May 1988.

2. The hazards to personnel from NBC contaminants are known to most individuals. Less familiar are collateral hazards of these contaminants to materiel. For example, accumulation of fallout particles in air-cooled electronic devices may result in degraded or failed functioning of circuits due to radiation. Biological agents and the nutrients with which they are dispersed can erode materials upon which they become deposited. Chemical agents, due to their solvent properties, attack most items including optics, canopies, gaskets, cables, bearings, electronics, and electrical components. Similar effects can result from exposure to decontaminants and decontamination processes.

3. Comprehensive mission effectiveness in NBC environments requires countering not only the hazards to personnel, but also the hazards to materiel. Complementing the use of traditional NBC defensive items for detection, individual protection, collective protection, and decontamination to assure optimal crew performance is the use of NBCCS to assure optimal materiel performance.

4. References a through d express the concerns of the Defense and individual Service Departments about these hazards to materiel. These documents set the framework for programs to assure incorporation of NBCCS characteristics into military materiel. These NBCCS characteristics address 3 ways to prevent NBC contamination from causing degraded or failed performance of systems. The HARDNESS characteristic addresses fabrication of systems with materials and designs which preclude damage by NBC contaminants. The DECONTAMINABILITY characteristic addresses use of materials and designs which minimize the time that systems are off-line while undergoing active decontamination procedures or passive weathering for removal of contaminants. The COMPATIBILITY characteristic addresses use of designs which optimize the operation of systems by personnel in full NBC protective gear.

5. Although not yet finalized, contractual opportunities in the NBCCS area are expected to include agent testing support for development of methodologies, general support for development of a training package containing case studies, and testing support for the agents/decontaminants/materials data bases. Of particular importance are the contractual opportunities in support for all the materiel developers, both governmental and industrial, who have NBCCS requirements. These opportunities include assessments, modelling, testing, and engineering/design.

6. Detailed information on both the effects of NBC contaminants on materiel and elaboration of the hardness/decontaminability/compatibility characteristics of NBCCS is available from the NBC Survivability Office, U.S. Army Chemical Research, Development and Engineering Center, Aberdeen Proving Ground, MD, 21010-5423. The telephone numbers are the following: Commercial: (301) 671-3420/3090; Autovon: 584-3420/3090.

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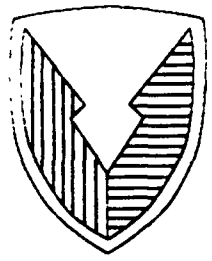


U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

STANDOFF AND POINT DETECTION

by

DR. R. MACKAY
Detection Directorate

SMCCR-DDT
AREA CODE (301) 671-5532
AUTOVON (584) 5532

AO332-C-C9-224959

BIO-CHEMICAL DETECTOR TECHNOLOGY

BC DETECTOR

OBJECTIVES:

- POINT DETECTION ALARM
- CLASSIFIES AND SEMIQUANTITATES NERVE/BLISTER/PATHOGEN/ TOXIN/BLOOD AGENTS
- DETECTS RADIATION
- SENSITIVITY - HUMAN RESPONSE LEVELS
- UNATTENDED OPERATION - 24 HOURS
- WEIGHT/SIZE - 10 POUNDS, 1 CUBIC FOOT
- MODULAR

PHASE:

EXPLORATORY DEVELOPMENT

A0332- X9 0746-02

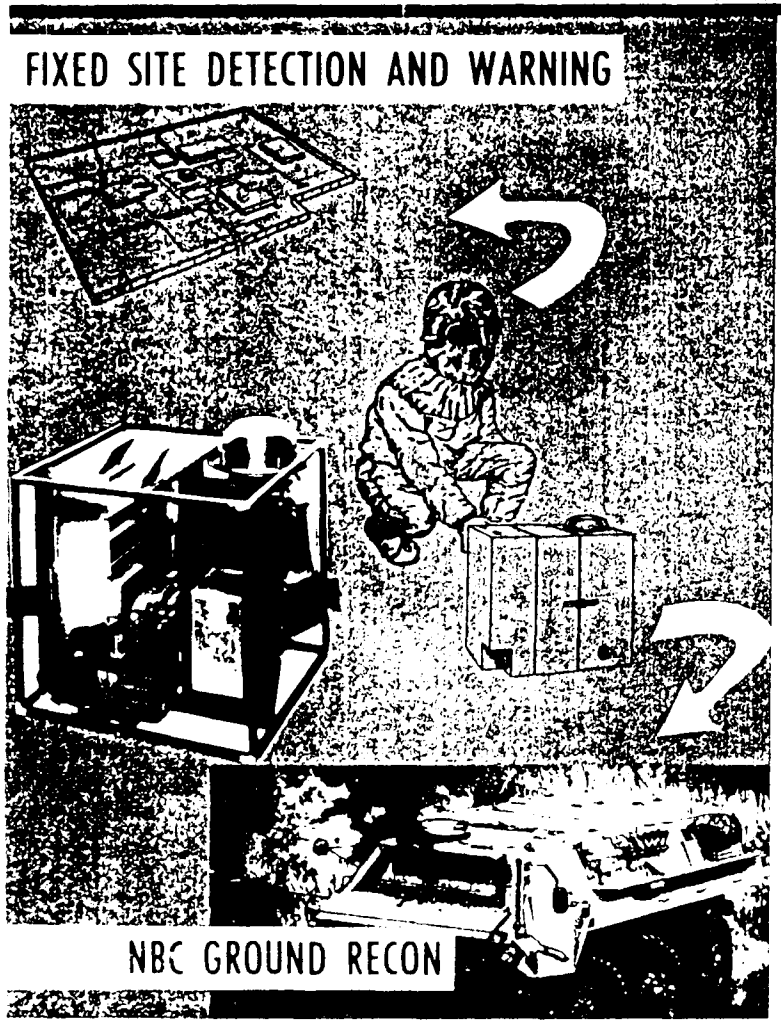
BIO-CHEMICAL DETECTOR

CONTRACT OPPORTUNITY

OBJECTIVE: FABRICATE PROTOTYPE BIO-CHEMICAL DETECTOR AND DEVELOP PRELIMINARY TECH DATA PACKAGE

- 6.3B PROOF OF PRINCIPLE
- AWARD DATE: 1QFY92
- CONTRACT LENGTH: 24 MONTHS
- APPROXIMATE VALUE: < 2 MILLION
- TYPE: COST PLUS FIXED FEE

BC MASS SPECTROMETER TECHNOLOGY



CB MASS SPECTROMETER

OBJECTIVES:

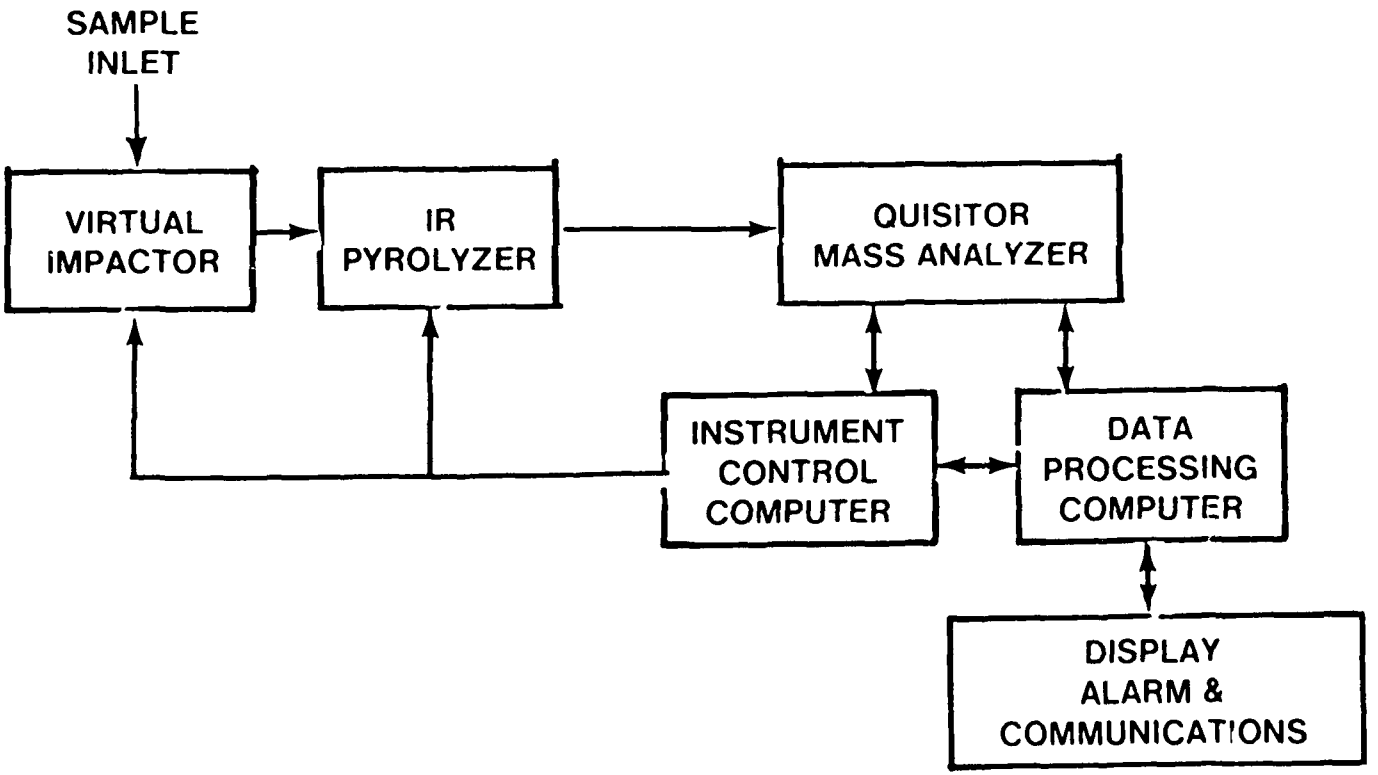
- IDENTIFIES AND QUANTIFIES ALL KNOWN CHEMICAL AND BIOLOGICAL AGENTS
- CHARACTERIZES NEW AGENTS
- SENSITIVITY - HUMAN RESPONSE LEVEL
- MODULAR DESIGN
- WEIGHT/SIZE - 55 POUNDS, 2.5 CUBIC FEET

PHASE:

EXPLORATORY DEVELOPMENT

AO332 P9 1594-01

CB MASS SPECTROMETER



AO332-P9-1594-04

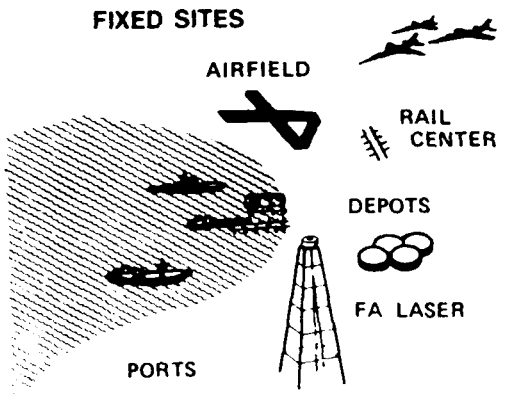
CB MASS SPECTROMETER

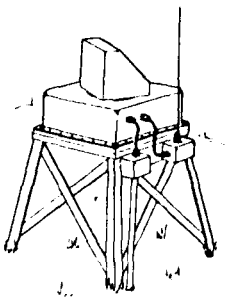
CONTRACT OPPORTUNITY

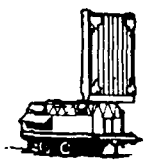
OBJECTIVE: FABRICATE PROTOTYPE CB MASS SPECTROMETER AND DEVELOP PRELIMINARY TECH DATA PACKAGE

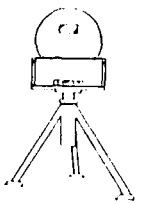
- 6.3B PROOF OF PRINCIPLE
- AWARD DATE: 1QFY93
- CONTRACT LENGTH: 24 MONTHS
- APPROXIMATE VALUE: < 3 MILLION
- TYPE: COST PLUS FIXED FEE

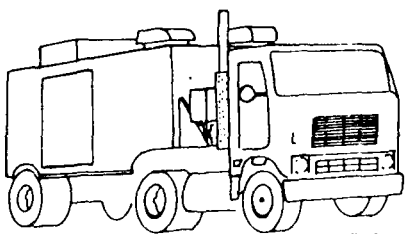
STANDOFF DETECTION

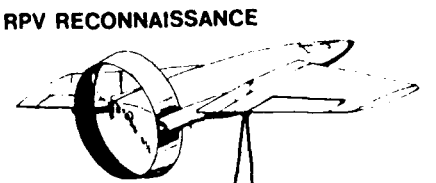










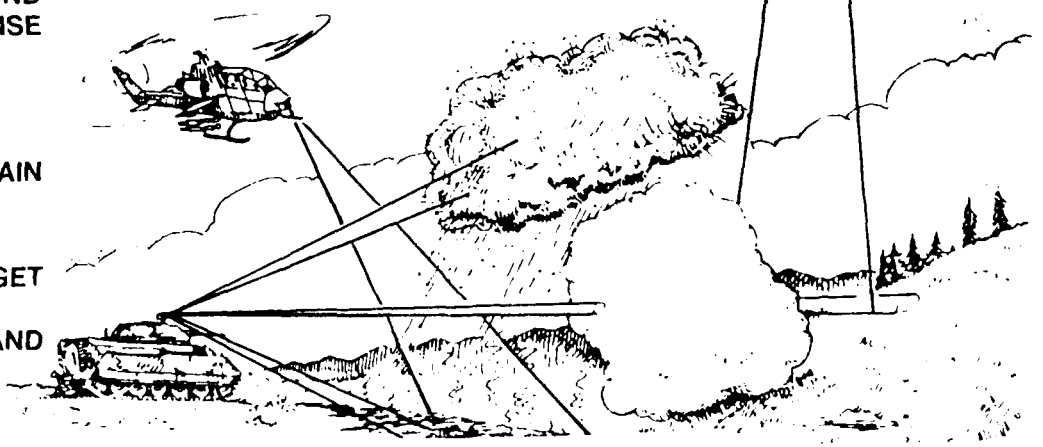


OBJECTIVE

- DEVELOP STANDOFF DETECTION SYSTEMS FOR NBC DEFENSE APPLICATIONS INCLUDING GROUND AND AIR RECONNAISSANCE, FIXED SITE DEFENSE AND SPECIAL APPLICATIONS

CAPABILITIES

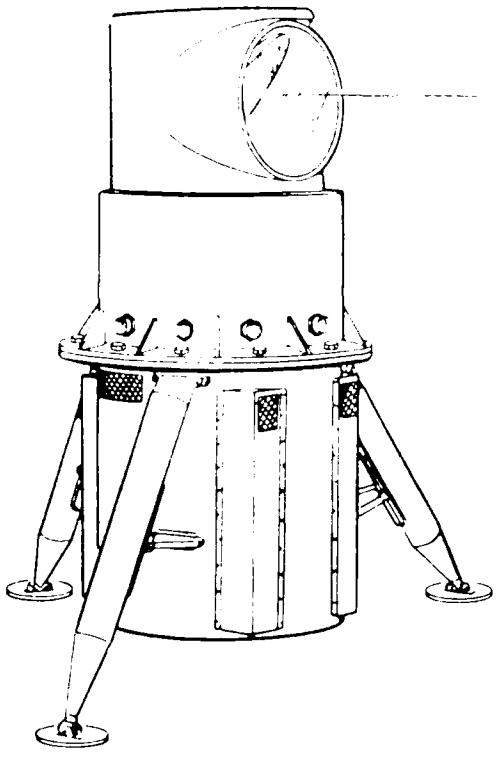
- SCAN SURROUNDING ATMOSPHERE AND TERRAIN FOR NBC CONTAMINATION
- FIXED OR MOBILE OPERATIONAL CAPABILITY
- RAPID WIDE AREA CHEMICAL VAPOR TARGET ACQUISITION
- DETECT CHEMICAL VAPORS, AIRBORNE LIQUIDS AND PARTICULATES, AND GROUND CONTAMINATION
- RANGING AND QUANTITATIVE DATA
- CONTAMINATION PROFILE MAPPING
- DETECT/IDENTIFY INCOMING MUNITIONS
- NBC ENVIRONMENT SURVIVABLE



CONTAMINATION AVOIDANCE/RECONNAISSANCE

AO332-G8 1835-04

REMOTE ACTIVE SPECTROMETER (RAS)



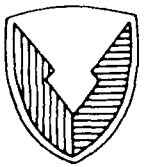
JOINT CRDEC/CNVEO EFFORT

- LASERS – 4
- PULSE WIDTH – 100 NSEC IN GAIN SWITCHED SPIKE
- SPECTRAL RANGE – 9.201 – 10.811 μM
- PULSE RATE PER LASER – 10 HZ
- LIFETIME – $> 10^6$ PULSES/LASER
- ENERGY OUTPUT – 5-40 MJ INTEGRATED OVER GAIN SWITCHED SPIKE
- SIZE – $<$ 5 cu ft
- WEIGHT WITH TRIPOD – $<$ 200 LBS
- INPUT POWER – $<$ 600 WATTS
- NOMINAL CL SENSITIVITY – 60 mg/m^2 (WITH 50 PULSE INTEGRATION)
- NOMINAL RANGE – 150m – 3Km TOPOGRAPHIC REFLECTION MODE
  – 150m – 1Km RANGE RESOLVED MODE
- SCAN – $\pm$5 EL, $\pm$ 30 AZ

AO332-Y9 0107-05

SMCCR Form 38, 1 April 1985

STANDOFF PROGRAMS



- LASER IR STANDOFF FOR CHEMICAL DETECTION CURRENTLY UNDER DEVELOPMENT FOR GROUND MOBILE SYSTEMS
  - MAIN THRUST IS LIGHTWEIGHT FREQUENCY AGILE LASER
  - OTHER ELEMENTS INCLUDE COMPLEX OPERATING ALGORITHM FOR THE SIMULTANEOUS DETECTION OF VAPOR, AEROSOL RAINS AND GROUND CONTAMINATION
- PASSIVE IR STANDOFF CURRENTLY UNDER DEVELOPMENT FOR UAV APPLICATIONS
  - MAIN THRUST IS LIGHTWEIGHT HIGH EFFICIENCY INTERFERMOMETER
  - OTHER ELEMENTS INCLUDE HIGHLY COMPLEX PATTERN RECOGNITION ALGORITHMS RUNNING ON DSP BASED COMPUTER
- BIOLOGICAL DETECTION LASER TECHNOLOGY DEMONSTRATED USING UV LIF

FUTURISTIC SYSTEMS

- ARE THERE BETTER WAYS TO PERFORM STAND-OFF DETECTION?
  - USE SOME OTHER MEANS TO DETECT EVENT; RESERVE LASERS/ INTERFEROMETERS FOR IDENTIFICATION/DISCRIMINATION
    - DETECT OTHER PHYSICAL PARAMETERS OF THREAT
      - * TRANSPORT FEATURES - VELOCITY/SPATIAL EXTENT/ TEMPORAL DISTRIBUTION CHARACTERISTICS
      - * THERMAL IMAGING MULTI SPECTRAL SCANNER
      - * RADAR TARGET ACQUISITION/TRACKING
- THERE APPEARS TO BE A NEED FOR BOTH ACTIVE AND PASSIVE CAPABILITIES
  - INTEGRATED SYSTEM
    - MODULAR DESIGN
- ADVANCED SIGNAL PROCESSING
  - HARDWARE
    - ARTIFICIAL INTELLIGENCE

STANDOFF DETECTION
ADVANCED SCIENCE BASE

OBJECTIVE: CONTACT VARIOUS SCIENCE BASE STUDIES ON ADVANCE STANDOFF DETECTION CONCEPTS FOR CHEMICAL AND BIOLOGICAL DETECTION INCLUDING: COHERENT DETECTION, FM SPECTROSCOPY, PASSIVE DETECTION, ADVANCED INFORMATION PROCESSING/AI CONCEPTS, INTEGRATED SENSOR CONCEPTS

TYPE: COST PLUS FIXED FEE

6.2 EXPLORATORY DEVELOPMENT:
AWARD DATE - FY93
CONTRACT LENGTH - 60 MONTHS
APPROXIMATE VALUE - < $5M

AO332-X9 2323-02

STAND-OFF LASER GROUND RECON DEMO

CONTRACT OPPORTUNITY

OBJECTIVE: DESIGN, INTEGRATE AND INSTALL AD PROTOTYPE LIDAR SYSTEM (REMOTE ACTIVE SPECTROMETER) INTO GROUND RECON TEST BED VEHICLE AND SUPPORT USER DEMONSTRATION

TYPE: COST PLUS FIXED FEE

6.3B PROOF OF PRINCIPLE:

AWARD DATE - FY 93

CONTRACT LENGTH - 24 MONTHS

APPROXIMATE VALUE - < $3 MILLION

AO332-X9 0107-15

CHEMICAL STANDOFF DETECTION

CONTRACT OPPORTUNITY

OBJECTIVE: BUILD SEVERAL DIFFERENT TYPES OF LIGHT WEIGHT, FREQUENCY AGILE CO_2 PULSE LASERS AND CONDUCT SIDE BY SIDE EVALUATIONS TO DETERMINE THE BEST DESIGN FOR FUTURE GROUND RECON LASER STANDOFF DETECTORS

TYPE: COST PLUS FIXED FEE

6.2 (NUNN): AWARD DATE - FY90

CONTRACT LENGTH - 18 MONTHS

APPROXIMATE VALUE - < $2M

FUTURE CONTRACT OPPORTUNITIES

YEAR	TITLE	AMOUNT	POC AND PHONE
90 - 92	LIGHTWEIGHT FREQUENCY AGILE LASER (6.2)	< $2M	Mr. Steven Gotoff (301)671-5561
92 - 93	STANDOFF LASER GROUND RECON DEMO (6.3A)	< $3M	Mr. Steven Gotoff (301)671-5561
92 - 93	BIO-CHEMICAL DETECTOR (6.3B)	< $2M	Mr. Alan Zulich (301)671-5573
93 - 94	CB MASS SPECTROMETER (6.3B)	< $3M	Dr. William Lagna (301)671-5581
93 - 98	STANDOFF DETECTION ADVANCED SCIENCE BASE	< $5M	Mr. Kirkman Phelps (301)671-5561

AO332-Y9 2323-01

U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND
CHEMICAL RD&E CENTER

MULTIPURPOSE INTEGRATED CHEMICAL AGENT DETECTOR (MICAD)

by

MR. J. SZACHTA
Detection Directorate

SMCCR-DDW
AREA CODE (301) 671-2108
AUTOVON (584) 2108

AO332-C-C9-224950

MULTIPURPOSE INTEGRATED CHEMICAL AGENT ALARM (MICAD)

DESCRIPTION:

- RAPID NBC DETECTION AND WARNING FOR THE BATTLEFIELD
- CONNECTS THE DETECTION AND WARNING SYSTEM WITH COMMAND AND CONTROL, AND COLLECTIVE PROTECTION EQUIPMENT
- FLEXIBLE DESIGN PERMITS USE WITH COMBAT VEHICLES, VANS, AND SHELTERS
  - Command and control radios
  - NBC detectors
  - Collective Protection equipment
  - Vehicle navigation system
- ANBACIS/MANEUVER CONTROL SYSTEM COMPATIBLE

AO332-X9 2298-02

MICAD OPERATIONAL MODE/ HARDWARE DEFINITION

HARDWARE	MODE		
	MOUNTED OPERATIONS	REMOTE OPERATIONS	COLLOCATED OPERATIONS
DISPLAY/CONTROL	✓	✓	✓
SAMPLE TRANSFER SYSTEM	✓		
TELEMETRY LINK		✓	
XM22 ACADA	✓	✓	✓
AN/VDR-2 RADIAC	✓		✓
OTHER NBC DETECTORS	✓	✓	✓
TACTICAL C2 RADIO	✓	✓	✓
NAV SYSTEM	✓		
CPE	✓		

AO332 X9 2298 03

CONTRACT OPPORTUNITY
ENGINEERING DEVELOPMENT

MULTIPURPOSE INTEGRATED CHEMICAL AGENT ALARM (MICAD) SYSTEM

OBJECTIVE: DEVELOP 6.3B PROTOTYPE SAMPLE TRANSFER SYSTEM, DISPLAY/CONTROL

IDENTIFY AND TEST TELEMETRY LINK

CONCLUDE WITH TECHNICAL DEMONSTRATION OF HARDWARE

TYPE: COMPETITIVE, CPFF

STATUS: 6.3B DEVELOPMENT

SCHEDULE: AWARD DATE - 2QFY90

CONTRACT LENGTH - 24 MONTHS

APPROXIMATE VALUE: < $10 MILLION

AO332-X9 2298-01

SMCCR Form 38, 1 April 1985

U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND
CHEMICAL RD&E CENTER

SMOKE SYSTEMS

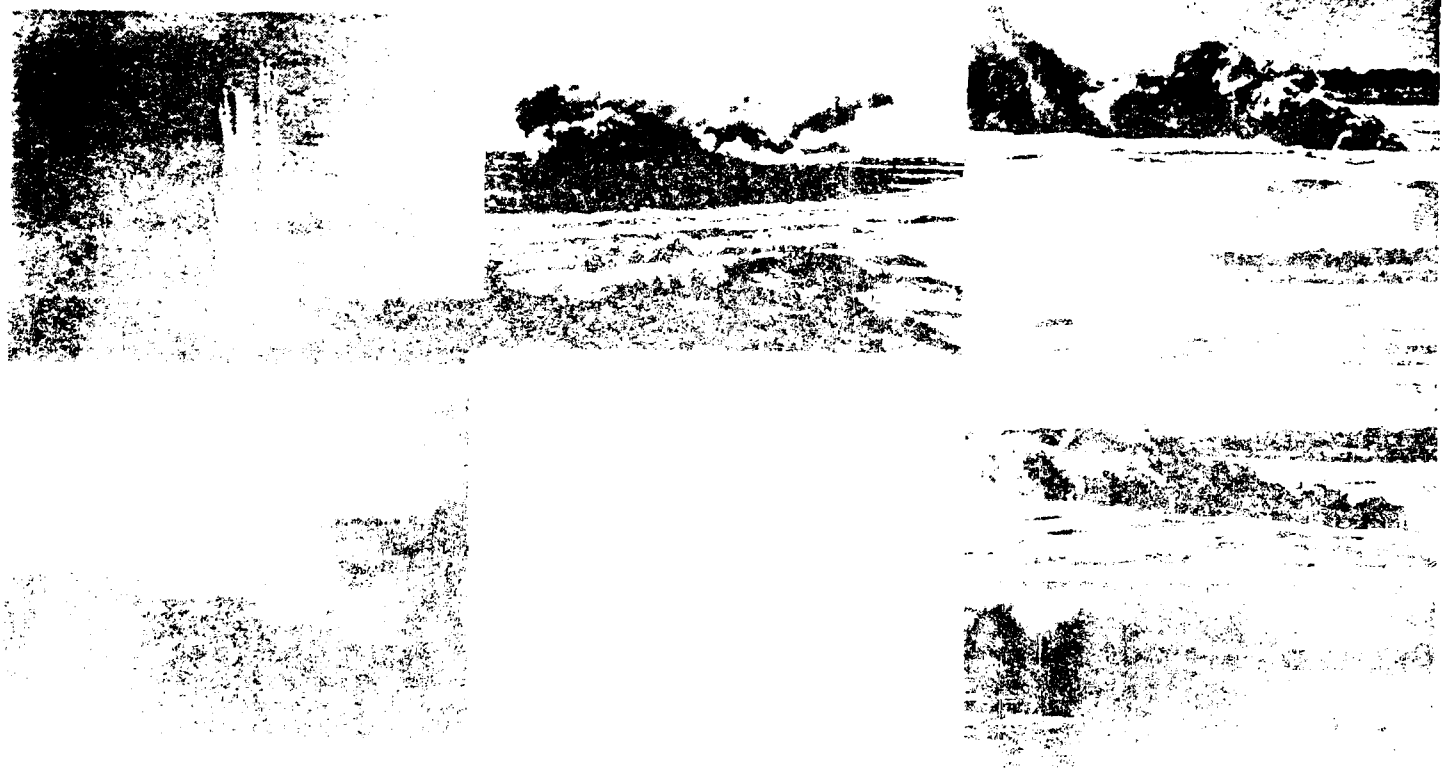
by

MR. J. WEINAND
Munitions Directorate

SMCCR-MUS-S
AREA CODE (301) 671-3450
AUTOVON (584) 3450

AO332-C-C9-224961

SMOKE AND OBSCURANTS



FUTURE ITEMS

-LARGE AREA MULTISPECTRAL GENERATORS

-MULTISPECTRAL ROCKET

-MULTISPECTRAL ARTILLERY

-PERIMETER OBSCURATION DEVICE (VISUAL ONLY)

-MULTISPECTRAL SMOKE POTS

-TRAINING GRENADES

-ROBOTIC SMOKE DELIVERY SYSTEM

-SMOKE CLEARING SYSTEM

-VEESS WITH JP-8

MATERIALS

-IMPROVED VISUAL SCREENING

-IMPROVED IR SCREENING

-IMPROVED MMW SCREENING

-IMPROVED CMW SCREENING

-IMPROVED VISUAL - CM WAVE SCREENING

MATERIAL CONSTRAINTS

-NO HEALTH IMPACTS

-NO ENVIRONMENTAL IMPACTS

-LOW COST

-DISSEMINATABLE

DISSEMINATION TECHNIQUES

(FOR IMPROVED MATERIALS)

-PYROTECHNIC

-EXPLOSIVE

-MECHANICAL

-PNEUMATIC

-OTHER?

DISSEMINATION TECHNIQUE GOALS

-SAFE

-NO ENVIRONMENTAL IMPACT

-USER FRIENDLY

PACKAGING

-TO WITHSTAND LAUNCH FORCES

-BIODEGRADABLE STRUCTURAL MATERIAL
(FOR TRAINING IN PARTICULAR)

-UNITARY FOR STORAGE, TRANSPORTATION & USE

MEASUREMENTS

-CONCENTRATION
OF HIGH ASPECT RATIO MATERIAL
OF IRREGULAR PARTICLES

-CONDUCTIVITY OF SMALL MATERIALS

-TRANSMISSION AT 94, 35, 10 GHZ
(IN THE FIELD)

-CLOUD GEOMETRY (IN THE FIELD)

COMPETITIVE OPPORTUNITIES

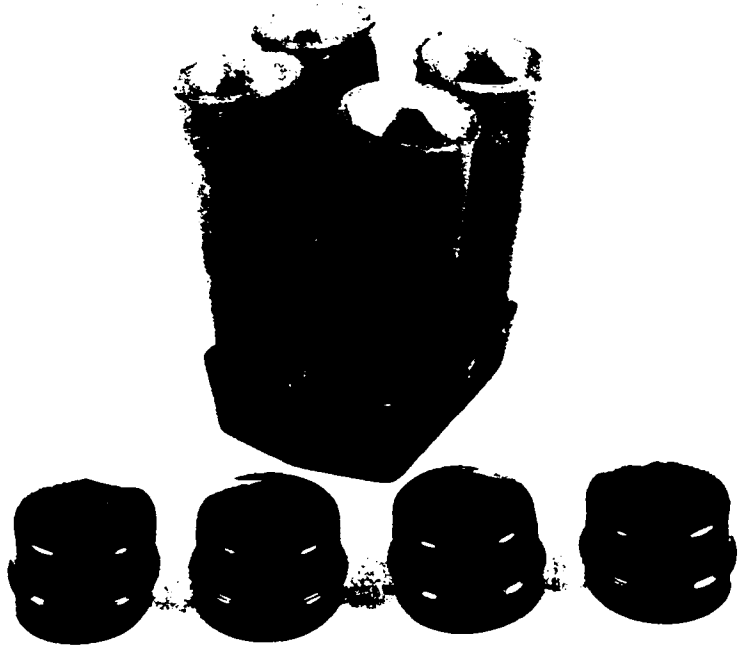
($K)

FY 90	FY 91	FY 92	FY 93
<1000	<1000	<1000	<1000

CONTACT

JOHN GREEN 301-671-2325

DISCHARGER, GRENADE, SMOKE, COUNTERMEASURE: XM6



PE/PROJ	90	91	92	93	94
6.4	<1000	<1500	<1000	<500	
PRODUCTION					>8000

DESCRIPTION

STORES L8, M76, XM81 GRENADES IN READY TO FIRE CONDITION. COMPACT ARRAYS PROVIDE NUMBER OF SALVOS REQUIRED BY MOST VEHICLES WHICH FURNISHES MOUNTING AND CONTROL PORTIONS OF MSGL

STATUS: PROOF OF PRINCIPLE

USER REQUIREMENTS: O&O PLAN - JAN 87
ROC - DRAFT; JUL 89

KEY TECHNOLOGIES/KEY MILESTONES

- MS I/II AUG 89
- MS III AUG 93
- FOE MAR 95

MATERIAL DEVELOPER: CRDEC/PM SMK

REQUIREMENT PROPONENT: ARMOR SCHOOL
INFANTRY SCHOOL

OTHER SERVICE INTEREST: U.S. MARINE CORPS

AO332-X9 1437-01

Contract Opportunities - XM6 Discharger

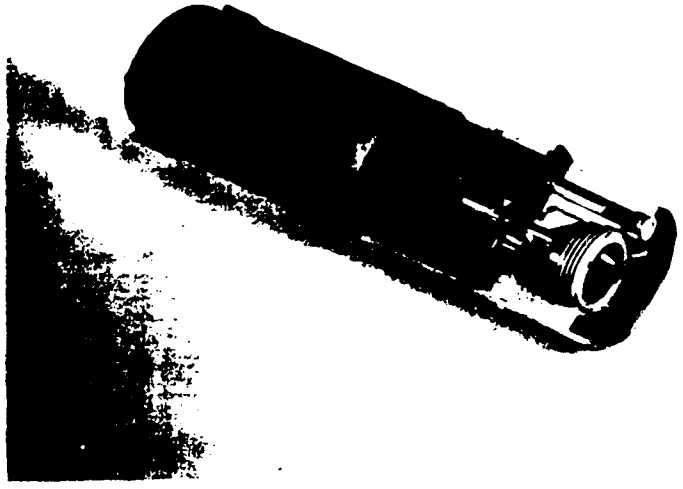
Solicit Competitive Full Scale Developement Contract
Oct 90

Solicit Competitive Initial Production Contract
Apr 93

CRDEC Point of Contact:

Screening Smoke Branch
SMCCR-MUS-S
APG, MD 21010-5423
Mr. Demetrois Prapas
(301) 671-3450 / 4280

GRENADE, LAUNCHER, SMOKE: MM SCREENING XM81



PE/PROJ	91	92	93	94	95
6.4	<1500	<2000	<1500	<500	
PRODUCTION					>5000

DESCRIPTION: MM MATERIAL FILLED M76 TYPE GRENADE, PROVIDE SCREENING IN MM WAVE REGION (WL 1-10 MM, FREQ 30-300 GHZ).

STATUS: PROOF OF PRINCIPLE

USER REQUIREMENTS: O&O PLAN - JAN 87
ROC - 4Q90

KEY TECHNOLOGIES/KEY MILESTONES:

MS 1/II	AUG 90
MS III	AUG 94
FUE	MAR 96

MATERIAL DEVELOPER: CRDEC-PM SMK

REQUIREMENT PROPONENT: ARMOR SCHOOL
INFANTRY SCHOOL

OTHER SERVICE INTEREST: US MARINE CORPS

A0332-X9-0007-01

Contract Opportunities - XM81 MMW Grenade

Solicit Competitive Full Scale Developement Contract
Oct 91

Solicit Competitive Initial Production Contract
Apr 94

CRDEC Point of Contact:

Screening Smoke Branch
SMCCR-MUS-S
APG, MD 21010-5423
Mr. Ben Wachob
(301) 671-3450 / 4280

CONTRACT FUNDS

FY	90	91	92
6.2	<2500	<2500	<1500

MATERIAL DEVELOPER: CRDEC/PEO CBM

REQUIREMENT PROPONENT: TRADOC

OTHER SERVICE INTEREST: U.S. MARINE CORPS

Contract Opportunities - HFM Smoke Support Program

Broad Area Announcement Briefing Oct 89

Submit Proposals 1 & 2 QTR FY 90

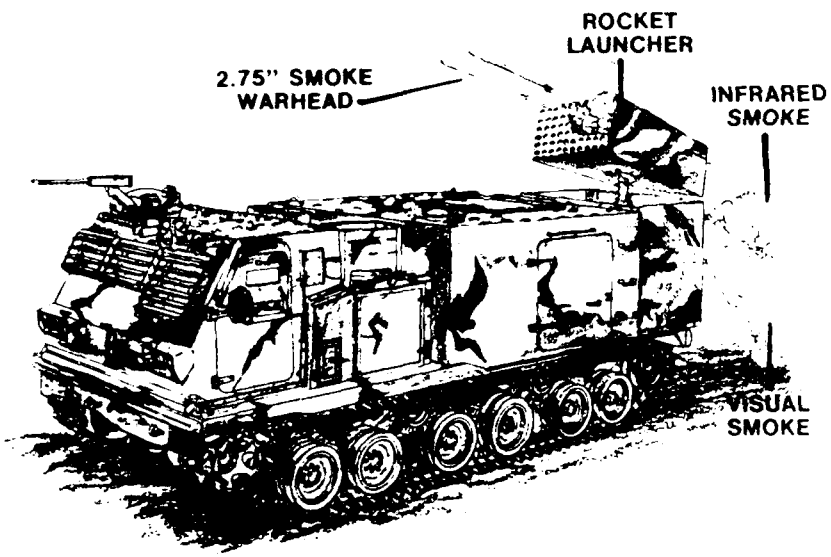
Award Selected Proposals 2 QTR FY 90

CRDEC Point of Contact:

Screening Smoke Branch
SMCCR-MUS-S
APG, MD 21010-5423
Mr. William Rouse
(301) 671-3450 / 4280

COMPETITIVE OPPORTUNITIES

LARGE AREA MOBILE PROJECTED SMOKE SYSTEM (LAMPSS)



Y9 2234-02

REQTS:

- PROJECTED SMOKE SCREENS
  - PROVIDE (4) 500 M WIDE SCREENS AT 6000 M FOR (5) MIN. EACH
  - DIRECT AND INDIRECT FIRE
- LARGE AREA VISUAL IR MMW SCREENS
  - (2) HR OPERATION W/O RESUPPLY
  - SELECTIVELY CHOOSE OBSCURANT MATERIALS
  - SCREENING COMPARABLE TO XM55 OR BETTER
- INTEGRATE SMOKE COMPONENTS INTO BRADLEY FIGHTING VEHICLE CHASSIS
- REPLACE M1059 SMOKE GENERATOR CARRIER

PROOF OF PRINCIPLE:

- COMPETITIVE CONTRACT
  - DEVELOP DESIGN
  - PREPARE DATA ITEMS
  - FABRICATE/INTEGRATE TEST HARDWARE
- CONTACT ROBERT EPSTEIN, 301-671-2390
- SOLICITATION PLANNED FOR FY91

CONTRACT OPPORTUNITIES

DEVELOPMENT PLANS, 6.3/6.4 FY91/FY94 AWARD

TASK	DOLLARS (K)	DATE	TYPE CONTRACT
● 6.3 DEVELOPMENT OF LAMPSS	<12,000	FY91-93	CPFF
● 6.4 DEVELOPMENT OF LAMPSS	<16,000	FY95-96	CPIF
– INITIAL PRODUCTION OPTION	<25,000	FY98	CPIF

A0332- X9 2234-03

COMPETITIVE OPPORTUNITIES

PRODUCT IMPROVEMENT OF
M76 IR SCREENING SMOKE GRENADE

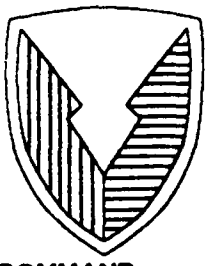
- COMPETITIVE CONTRACT TO MANUFACTURE TEST PROTOTYPE TITANIUM DIOXIDE SMOKE GRENADES
- CONTACT LISA BRAY,(301) 671-3007
- SOLICITATION PLANNED FOR FY90

AO332-X9 2312-01

SMOKE FUNDING SUMMARY

($K)

	90	91	92	93	94
6.2	3500	3500	2500	1000	1000
6.3/6.4	1000	7000	7000	6000	5000
PRODUCTION					13,000



U.S. ARMY
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MUNITIONS
CHEMICAL COMMAND
CHEMICAL RD&E CENTER

FLAME AND INCENDIARY WEAPONS

by

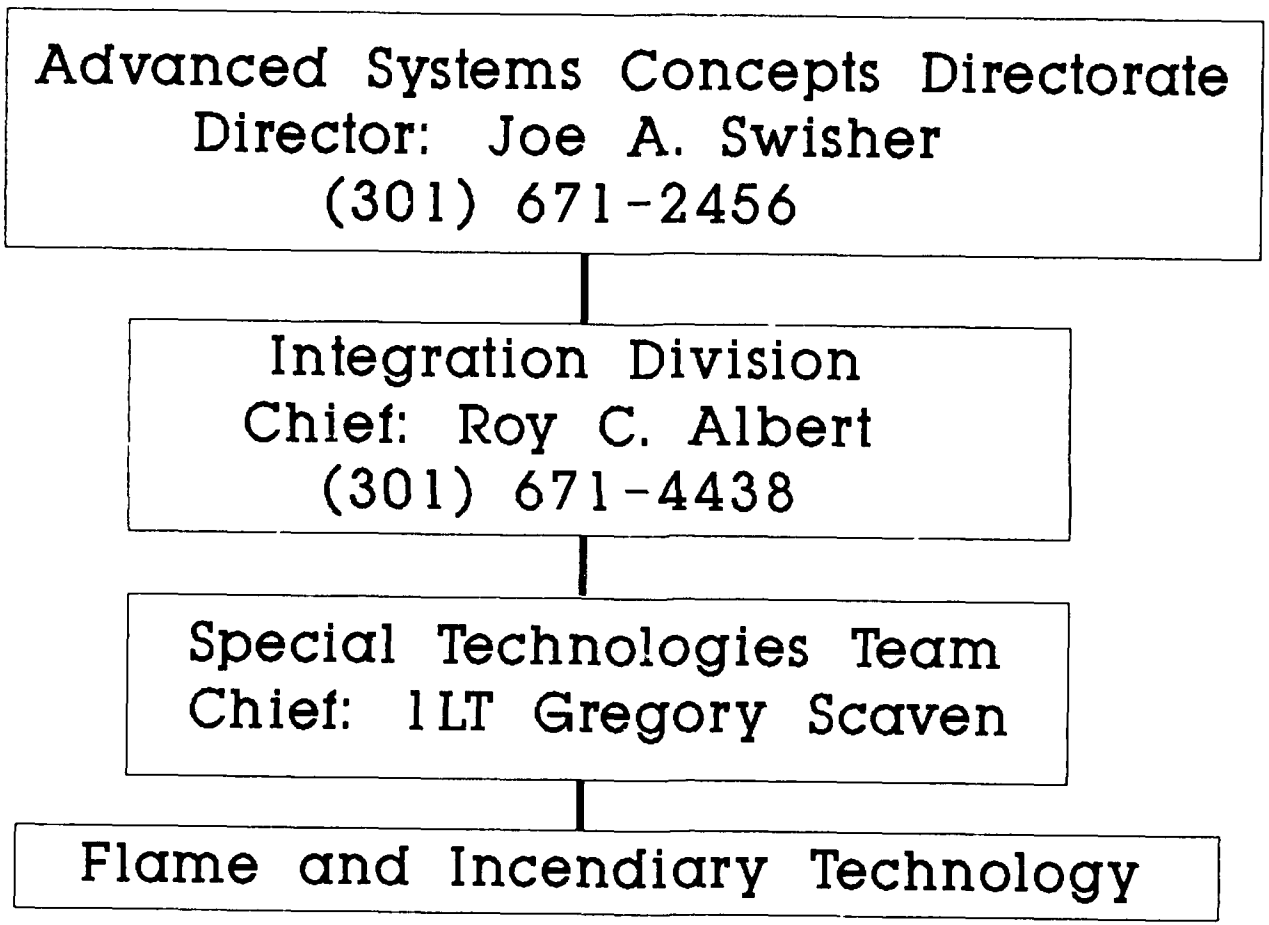
1LT G. SCAVEN

Advanced Systems Concepts Directorate

SMCCR-OPI-T
AREA CODE (301) 671-2229
AUTOVON (584) 2229

AO332-C-C9-224962

Flame and Incendiary Technology



Flame and Incendiary Technology

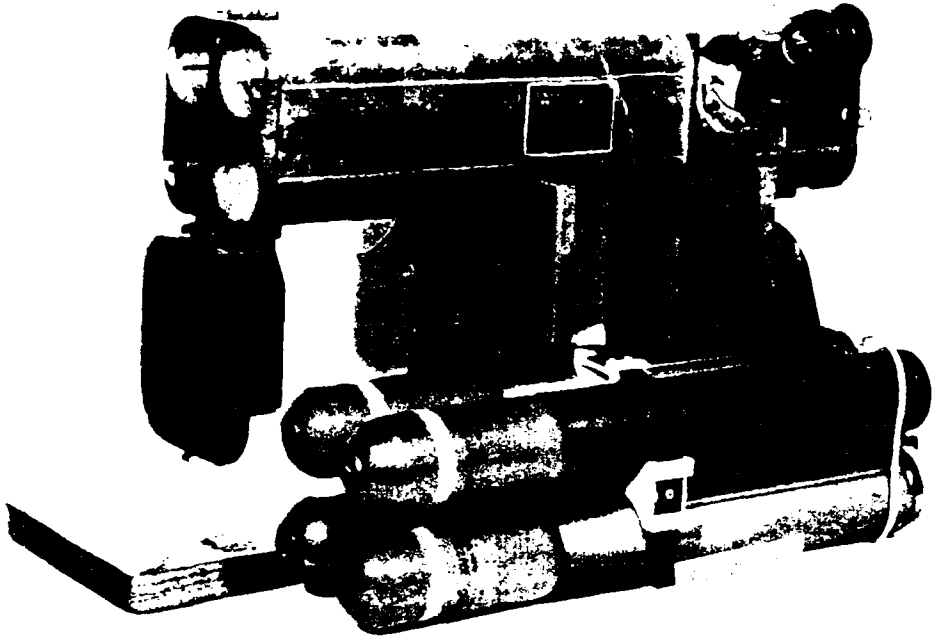
What are flame and incendiary materials?

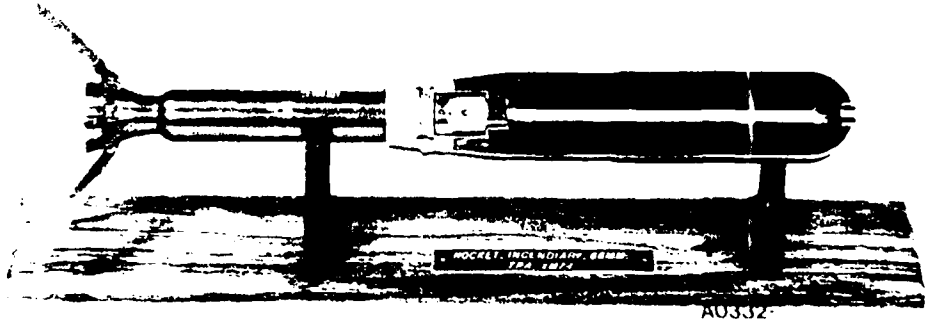
Any high temperature or high flux producing or reactive material, which includes traditional flame materials; incendiaries; interhalogen and oxygen based oxidizers; intermetallic, thermetic, and cermetic systems.

Why do we need them?

To develop capabilities where current weapons systems are deficient against selected targets.

M202A1 LAUNCHER WITH M74 INCENDIARY ROUND

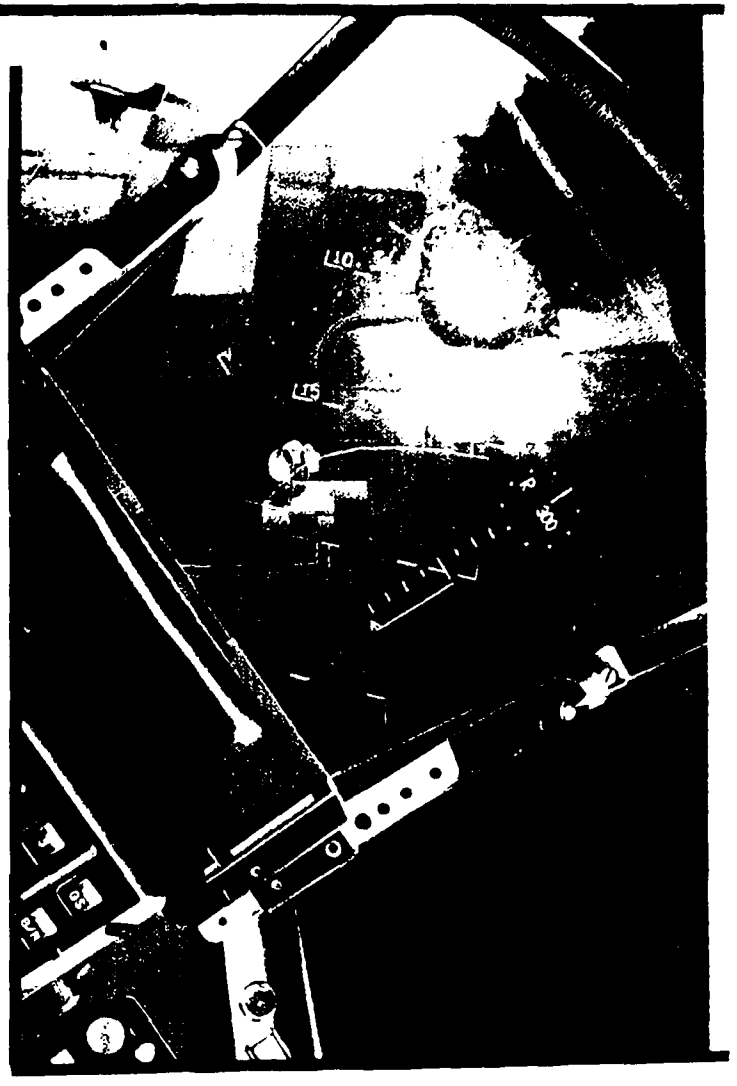




APPLICATIONS

FOCUSED

AREA



AO332-X9 2345-01

Possible Technologies

- Pyrophoric materials/mixtures
- Additives to pyrophoric materials
- Incendiary encapsulating materials
- Interhalogen and oxygen based oxidizers
- Thermetic, intermetallic and cermetic reactions
- High pressure/temperature reaction conditions
- Detonation of pyrotechnic materials
- Detonation of thermetic and intermetallic materials
- Detonation of hydrocarbon based materials
- Thickeners used for flame and incendiary systems
- Focused thermal reactions
- Metal erosion

Contract Opportunities

✓ Proof of Concepts

Objective: Demonstrate validity of material system concept(s) through breadboard scale developments

Type: Cost plus fixed fee

Schedule: Award Date - FY 90/ FY 91

Approximate Value: ⟨ $ 200K each

Contract Opportunities

✓ Systems Analysis

1. Objective: Develop methodology/model which quantifies the effects of exposure to flame weapons.

   Type: Cost plus fixed fee

   Schedule: Award Date - FY 90/FY 91

   Contract Length: 6 - 12 months

   Approximate Value: ⟨ $100K

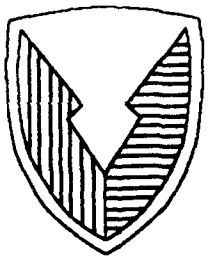
2. Objective: Define defeat characteristics required by a flame and incendiary material system.

   Type: Cost plus fixed fee

   Schedule: Award Date - FY 90/FY 91

   Contract Length - 6 - 12 months

   Approximate Value: ⟨ $50K



U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND

CHEMICAL RD&E CENTER

MISSION SUPPORT CONTRACTS

by

MR. J. CARTELLI

Advanced Systems Concepts Directorate

SMCCR-OPO
AREA CODE (301) 671-2359
AUTOVON (584) 2359

AO332-C-C9-224963

Support Contracts

Original MSC's

Hazardous Materials

Battelle

General Scientific & Technical

SRI

Technical & Administrative

GMA

Acquisition Plan

Double # of MSC from 3 - 6

Increase Competition

Expand Contractor Opportunities

Solicit More Focused SOW's

Reduce Subcontracting

Exploit Specialties in Chemical Industrial Base

Greater Prime Involvement & Expertise

Staggered Solicitations

Release 2 solicitations one month apart

Ease Proposal Preparation & Evaluation Burdens

Support Contracts

Original MSC's

Hazardous Materials

Battelle

General Scientific & Technical

SRI

Technical & Administrative

GMA

Second Generation MSC's

Chemical & Biological Sciences

Electronics & Electro-Optical Sciences

Manufacturing & Mechanical Sciences

Testing

Environmental Sciences

Studies and Technical Management

SUPPORT CONTRACTS
The Next Generation

Mission Support Contract Title	Ceiling Hours
Full & Open Competition	
Chemical & Biological Sciences	163,000
Electronics and Electro-Optical Sciences	106,500
Manufacturing and Mechanical Sciences	131,500
Testing	80,000
Small Disadvantaged Business Concern Set-Aside	
Environmental Sciences	91,000
Small Business Set-Aside	
Studies & Technical Management	79,000
Totals	650,000

Scopes of Work

Contract Title	Typical Tasks
Chemical & Biological Sciences	Toxicology Testing Process & Formular Optimization CB Material Design
Electronics & Electro-Optical Sciences	Algorithm/Software Development Electronic Hardware Design Detection Effectiveness Studies
Manufacturing & Mechanical Sciences	Hardware Fabrication End-Item Producibility Studies Technical Data Pkg Development
Testing	Agent Challenge Testing NBC Survivability Testing Development/Operational Testing
Environmental Sciences	Risk Assessments Hood Monitoring Waste Sampling & Testing
Studies & Technical Management	Mathematical Modeling ADP Training Front-End Analyses

Evaluation Criteria

- **Management Plan**
  - *Task order contracting experience*
  - *Program management system*
  - *Control of schedule and costs*
- **Response to Tasks**
  - *Cost efficient approach*
  - *Technically responsive & logical approach*
- **Broad Technical Abilities**
  - *Past technical performance*
  - *Familiarity with chemical R&D programs*
  - *Available facilities, & personnel resources*

Support Contracts
Design Features

Specialty Service	Primary Support KO	Secondary Support KO
Chem Surety Material Agent Testing	Testing*	Chemical/Biolog Sci Electro/Optical Sci
6.3b-6.4 Development Support & Fabrication	Manuf & Mech Sci	Chemical/Biolog Sci Electro/Optical Sci
6.1-6.3a Research & Development Support	Chemical/Biolog Sci Electro/Optical Sci	Studies & Tech Mgmt Manuf & Mech Sci
Risk Assessments & Hazards Projections	Environmental Sci	Studies & Tech Mgmt

* ▪ CSM Facility Required by Prime

Forecast

	Solicitation Release	Contract Award
• *Environmental Sciences* • *Chemical & Biological Sciences*	*OCT 89*	*MAY 90*
• *Electronics & Electro-Optics Sciences* • *Studies & Technical Management*	*NOV 89*	*JUL 90*
• *Manufacturing & Mechanical Sciences* • *Testing*	*DEC 89*	*AUG 90*

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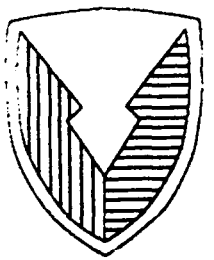

U.S. ARMY
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CHEMICAL RD&E CENTER

VALUE ENGINEERING OPPORTUNITIES

by

MR. F. KOHUT
Value Engineering Office

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AUTOVON (584) 3592

AO332-C-C9-224964

USE OF VE CLAUSE

ALL CONTRACTS OVER $100,000 EXCEPT CONTRACTS:

- FOR RESEARCH AND DEVELOPMENT OTHER THAN FULL-SCALE DEVELOPMENT;
- FOR ENGINEERING SERVICES FROM NOT-FOR-PROFIT OR NON-PROFIT ORGANIZATIONS;
- FOR PERSONAL SERVICES;
- PROVIDING FOR PRODUCT OR COMPONENT IMPROVEMENT, UNLESS THE VALUE ENGINEERING INCENTIVE APPLICATION IS RESTRICTED TO AREAS NOT COVERED BY PROVISIONS FOR PRODUCT OR COMPONENT IMPROVEMENT;
- FOR COMMERCIAL PRODUCTS THAT DO NOT INVOLVE PACKAGING SPECIFICATIONS OR OTHER SPECIAL REQUIREMENTS OR SPECIFICATIONS; OR
- WHEN THE AGENCY HEAD HAS ELECTED TO EXEMPT THE AGENCY (OR A CATEGORY OF CONTRACTS) FROM THE REQUIREMENTS OF THIS PART 48.

A0332- XX6295803.01

WHAT FAR CLAUSES ARE AVAILABLE?

- INCENTIVE (I)
- PROGRAM REQUIREMENTS (R) (ALTERNATE I)
- INCENTIVE AND PROGRAM REQUIREMENTS (I&R) (ALTERNATE II)
- SPECIAL PARAGRAPH (SP)

A0332- EE62150-01.01

PROGRAM REQUIREMENTS CLAUSE

- MANDATORY VE PROGRAM
- GOVERNMENT FUNDS SPECIFIC EFFORT
- CONTRACTOR SHARE OF SAVINGS SMALLER

A0332- B8 0035-02

SMCCR Form 38, 1 April 1985

INCENTIVE CLAUSE

- VOLUNTARY
- CONTRACTOR RISKS ITS FUNDS
- CONTRACTOR SHARE OF SAVINGS LARGER

A0332- B8 0035-01

WHY BOTH PROGRAM REQUIREMENTS AND INCENTIVE?

WHEN A PROGRAM REQUIREMENT IS RESTRICTED TO CLEARLY DEFINED PHASES OF WORK, AN INCENTIVE CLAUSE SHALL ALSO BE INCLUDED IF AUTHORIZED. IT IS RESTRICTED TO THOSE PHASES OF THE WORK NOT COVERED BY THE PROGRAM REQUIREMENT.

A0332- EE62150-06.01

SPECIAL PARAGRAPH

IN THE DEFINITION OF ACQUISITION SAVINGS: "A NUMBER EQUAL TO THE QUANTITY REQUIRED OVER THE HIGHEST 36 CONSECUTIVE MONTHS OF PLANNED PRODUCTION, BASED ON PLANNING OR PRODUCTION DOCUMENTATION AT THE TIME THE VECP IS ACCEPTED."

IS SUBSTITUTED FOR: "THE NUMBER OF FUTURE CONTRACT UNITS SCHEDULED FOR DELIVERY DURING THE SHARING PERIOD"

FAR CLAUSE 52.248-1

A0332 EE62150-04 01

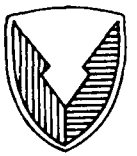
NONCONFIGURATION AREAS WITH VE POTENTIAL

- CONTRACT REQUIREMENTS
  - TECHNICAL
  - SUPPORT (INCLUDING PACKAGING, TRANSPORTATION AND HANDLING)
  - DATA
- GOVERNMENT FURNISHED EQUIPMENT (GFE)
- MANUFACTURING - PROCEDURES, PROCESSES, EQUIPMENT, ETC.
- INSTALLATION - EQUIPMENT, LAYOUT, PROCEDURES
- OPERATIONS - POLICY, LAYOUT, PROCEDURES, STAFFING
- MAINTENANCE - REPAIR POLICY, PROCEDURES, CYCLE OR LEVEL; TEST EQUIPMENT
- FACILITIES
- SOFTWARE
- TESTING

A0332- EE62150-07.02

MIL-STD-1771

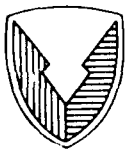
SUBSIDIARY BENEFIT OF VE PROGRAM



- APPLICATION TO CONTRACTOR INTERNAL PROCEDURES WILL REDUCE OPERATING COSTS
- CONTRACTOR WILL BE MORE COMPETITIVE - OBTAIN MORE BUSINESS
- GOVERNMENT WILL RECEIVE LOWER PRICED PROPOSALS/BIDS

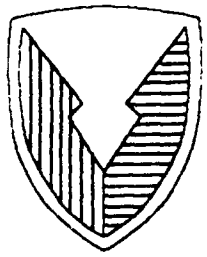
A0332- XX6298511.01

VALUE ENGINEERING



- REDUCING COSTS
- SHARING SAVINGS

A0332- XX6298502.01



U.S. ARMY
ARMAMENT
MUNITIONS
CHEMICAL COMMAND
CHEMICAL RD&E CENTER

INDUSTRIAL LIAISON PROGRAMS

by

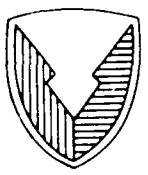
MR. R. HINKLE

Advanced Systems Concepts Directorate

SMCCR-OPP
AREA CODE (301) 671-2031
AUTOVON (584) 2031

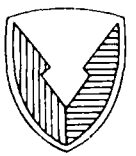
AO332-C-C9-224965

TECHNICAL INDUSTRIAL LIAISON ACTIVITIES



- SMALL BUSINESS INNOVATION RESEARCH (SBIR)
- BROAD AGENCY ANNOUNCEMENTS
- UNSOLICITED PROPOSALS
- INDEPENDENT RESEARCH AND DEVELOPMENT
- UNFUNDED STUDIES
- CONTRACTOR SEMINARS

SMALL BUSINESS INNOVATION RESEARCH



- **OBJECTIVE:**

  STIMULATE AND SUPPORT QUALITY, INNOVATIVE R&D BY SMALL BUSINESSES IN DEFENSE RELATED PROBLEMS

- **THREE PHASE PROGRAM:**

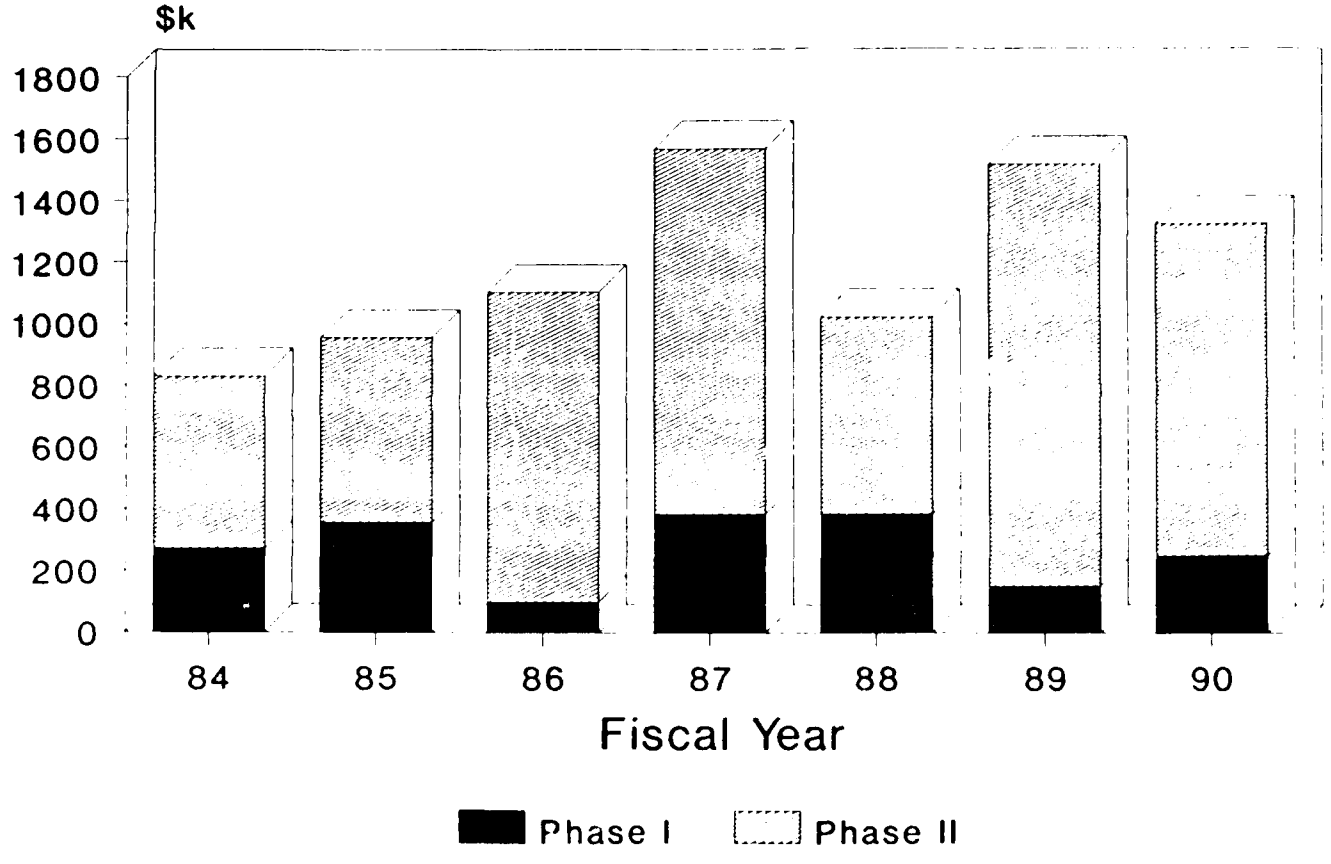
  I. MERIT AND FEASIBILITY OF IDEA

  II. RESULTS IN A WELL-DEFINED DELIVERABLE PRODUCT OR PROCESS

  III. DOD MISSION OR COMMERCIAL APPLICATIONS

AO332-Y9 2253-04

CRDEC SBIR FUNDING PROFILE



A0332-

SMCCR Form 38, 1 April 1985

SMALL BUSINESS INNOVATION RESEARCH

CRDEC TOPICS FOR FY 90

- DEVELOPMENT OF A DEVICE FOR SORTING MICRON-SIZED DIELECTRIC AND CONDUCTING POWDERS
- SINGLE PARTICLE MULTIANALYSIS CHAMBER
- ATMOSPHERIC PRESSURE ION-MOLECULE CHEMISTRY IN ION MOBILITY SPECTROMETERS FOR INCREASED SENSITIVITY AND SPECIFICITY
- VEHICLE INTERIOR DECONTAMINATION SYSTEM
- DETECTION OF LARGE MOLECULAR WEIGHT TOXINS

AO32-W9 2253-01

SMALL BUSINESS INNOVATIVE RESEARCH

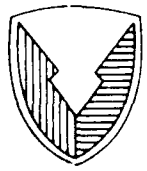
COPIES OF THE SOLICITATION . . .

Defense Technical Information Center
ATTN: DTIC / SBIR
Building 5
Cameron Station
Alexandria, Virginia 22304-6145

(800) 368-5211 or (202) 274-6902

AO332 Y9 3159 05

BROAD AGENCY ANNOUNCEMENT



- SOLICITS PROPOSALS IN BASIC RESEARCH, EXPLORATORY DEVELOPMENT
- ANTICIPATES VARIETY OF APPROACHES
- COUNTS AWARDS AS COMPETITIVE

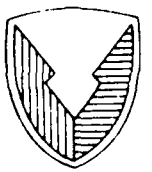
FY 90 BROAD AGENCY ANNOUNCEMENT

- COVERS ALL OF CRDEC'S MISSION AREAS
- AVAILABLE NOW
- SOLICITS PREPROPOSALS

AO332-W9 2253-03

SMCCR Form 38, 1 April 1985

OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS (ORTA)



- MANDATED BY:
  - PL 96-480, STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT
  - PL 99-502, FEDERAL TECHNOLOGY TRANSFER ACT OF 1986
- TRANSFER AND COMMERCIALIZE FEDERAL TECHNOLOGY
- PARTICIPATE IN FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER

FEDERAL TECHNOLOGY TRANSFER ACT OF 1986

COOPERATIVE R&D AGREEMENTS

THE DIRECTOR OF EACH FEDERAL LABORATORY MAY BE PERMITTED TO:

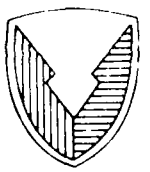
1) ENTER INTO COOPERATIVE R&D AGREEMENTS
2) NEGOTIATE LICENSING AGREEMENTS

AGREEMENTS MAY BE MADE WITH:

- OTHER FEDERAL AGENCIES
- UNITS OF STATE AND LOCAL GOVERNMENT
- INDUSTRIAL ORGANIZATIONS
- PUBLIC AND PRIVATE FOUNDATIONS
- NON-PROFITS (INCLUDING UNIVERSITIES)
- OTHER PERSONS

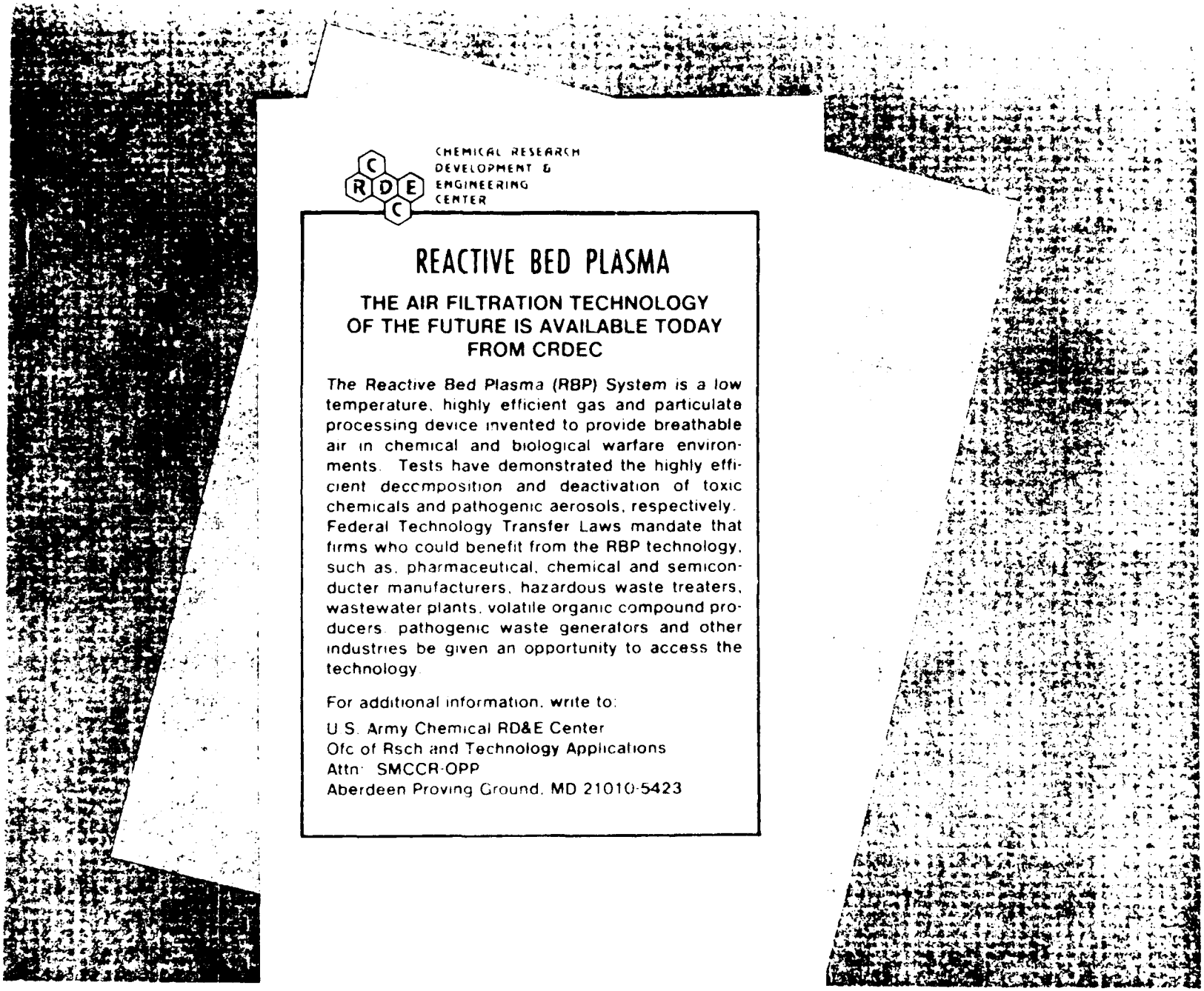
A0332-J9 0997-06

COOPERATIVE R&D AGREEMENTS



- ACCEPT FUNDS, PERSONNEL, SERVICES, AND PROPERTY FROM COLLABORATING PARTIES
- SUPPLY ANY OF THESE, EXCEPT FUNDS, TO COLLABORATING PARTIES
- GRANT (OR AGREE TO GRANT IN ADVANCE) PATENT LICENSES, ASSIGNMENTS OR OPTIONS FOR INVENTIONS OF LAB EMPLOYEES
- WAIVE RIGHT OF OWNERSHIP, EXCEPT FOR LICENSE, TO INVENTIONS MADE BY COLLABORATORS

A0332-J9 0997-07



CHEMICAL RESEARCH
DEVELOPMENT &
ENGINEERING
CENTER

REACTIVE BED PLASMA

THE AIR FILTRATION TECHNOLOGY OF THE FUTURE IS AVAILABLE TODAY FROM CRDEC

The Reactive Bed Plasma (RBP) System is a low temperature, highly efficient gas and particulate processing device invented to provide breathable air in chemical and biological warfare environments. Tests have demonstrated the highly efficient decomposition and deactivation of toxic chemicals and pathogenic aerosols, respectively. Federal Technology Transfer Laws mandate that firms who could benefit from the RBP technology, such as, pharmaceutical, chemical and semiconducter manufacturers, hazardous waste treaters, wastewater plants, volatile organic compound producers, pathogenic waste generators and other industries be given an opportunity to access the technology.

For additional information, write to:

U.S. Army Chemical RD&E Center
Ofc of Rsch and Technology Applications
Attn: SMCCR-OPP
Aberdeen Proving Ground, MD 21010-5423

TILO/ORTA

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US Army Chemical Research, Development
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