



Interagency Agreement
Shared Service Center **IASSC**
Customer Centered, Service Oriented

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY Interagency Agreement Shared Service Center

EAST

Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 3903R
Washington, D.C. 20460

WEST

Park Place Building
1200 Sixth Avenue, Suite 900
Mail Stop: OMP-145
Seattle, WA 98101

JUL 30 2015

EPA Reference: RW-97-92434401-0

Dear Interagency Agreement (IA) Recipient:

Please find attached an electronically signed pdf of a new or amendment IA between EPA and your Federal Agency. **Please note a signature is needed by your authorizing official in box 41 of the EPA 1610 form for this IA to be obligated and legally binding.**

If you wish to accept the agreement, please have your authorizing official sign box 41 of the EPA 1610-1 form and return a signed copy within 3 weeks of this date.

Please return the signed IA using one of the following methods:


- Pdf scan to IA specialist smith.leon@epa.gov
- Fax 202-565-2470 (Attn: Leon Smith)
- EPA mailing address in box 38 of the EPA Form 1610-1

If you have questions, please contact the EPA Project Officer listed in box 14 or the IA Specialist listed in box 6 of the attached EPA 1610 form.

Sincerely,
Francis Roth, Chief
IASSC EAST
FISB/GIAMD

Enclosure

cc: Brian Gullett
matthew.w.seaman2.civ@mail.mil

 <p>United States Environmental Protection Agency Washington, DC 20460</p> <p>Interagency Agreement/ Amendment</p> <p>Part 1 - General Information</p>		1. EPA IA Identification Number RW-97-92434401 - 0		2. Funding Location by Region EPA HQ					
		3. Other Agency IA ID Number (if known)		4. Awarding Office IASSC East					
		5. Type of Action New		6. IA Specialist: Leon Smith 202-564-5301					
7. Name and Address of EPA Organization US Environmental Protection Agency IASSC East 1200 Pennsylvania Avenue, NW Mail code 3903R Washington, DC 20460			8. Name and Address of Other Agency Department of Defense PD Joint Services Building 1 Annex Picatinny Arsenal, NJ 22202						
9. DUNS: 029128894		10. BETC: COLL		11. DUNS: DODW90Z7P					
12. BETC: DISB									
13. Project Title and Description Emission sampling at Radford Ammunition Depot Emissions from the open burning of ordnance will be sampled and characterized for composition and proportion to the ordnance.									
14. EPA Project Officer (Name, Address, Telephone Number) Brian Gullett 109 T.W. Alexander Drive (E343-04) Research Triangle Park, NC 27711 919-541-1534 E-Mail: gullett.brian@epa.gov FAX: 919-541-7885			15. Other Agency Project Officer (Name, Address, Telephone) Gabriela Dory Building 1 Annex Picatinny Arsenal, NJ 22202 973-724-5746 E-Mail: gabriela.a.dory.civ@mail.mil FAX: 073-724-7606						
16. Project Period: 08/03/2015 to 02/28/2016			17. Budget Period: 08/03/2015 to 02/28/2016						
18. Scope of Work (See Attachment) See Attached									
19. Employer/Tax ID No. 520852695		20. CAGE No: 347A4		21. ALC: 68-01-0727					
22. Statutory Authority for Transfer of Funds and Interagency Agreement Economy Act 31 U.S.C. 1535				23. Other Agency Type Federal Agency					
24. Revise Reimbursable Funds and Direct Fund Cites (only complete if applicable)									
	Previous Funding		This Action		Amended Total				
Revise Reimbursable (in-house)					0.00				
Direct Fund Cite (contractor)					0.00				
Total					0.00				
	Previous Amount		Amount This Action		Total Amount				
25. EPA Amount			\$0.00		\$0.00				
26. EPA In-Kind Amount					\$0.00				
27. Other Agency Amount			\$109,851.00		\$109,851.00				
28. Other Agency In-Kind Amount					\$0.00				
29. Total Project Cost			\$109,851.00		\$109,851.00				
30. Fiscal Information									
Treas. Symbol	DCN	FY	Appropriation	Budget Org	PRC	Object Class	Site/Project	Cost Org	Ob/De-Ob Amt
6815/160107		1516	CR	26CFXAV	102FK6XR2	0			93,754.00
6815/160107		1516	CR	26CFZAV	102FK6XR2	0			16,097.00
									109,851

Part II - Approved Budget

EPA IAG Identification Number

RW-97-92434401 - 0

31. Budget Categories	Itemization of All Previous Actions	Itemization of This Action	In-Kind Itemization of This Action	Itemization of Total Project Cost to Date
(a) Personnel		\$44,139.00		\$44,139.00
(b) Fringe Benefits				\$0.00
(c) Travel		\$10,820.00		\$10,820.00
(d) Equipment				\$0.00
(e) Supplies		\$12,080.00		\$12,080.00
(f) Procurement / Assistance		\$21,715.00		\$21,715.00
(g) Construction		\$5,000.00		\$5,000.00
(h) Other				\$0.00
(i) Total Direct Charges	\$0.00	\$93,754.00	\$0.00	\$93,754.00
(j) Indirect Costs:	\$0.00	\$16,097.00		\$16,097.00

Charged - Amount

Rate: 17.17%

Base: \$

Not Charged:

Funds-In: Not charged by EPA

Amount \$

(k) Total (EPA Share %) (Other Agency Share %)	\$0.00	\$109,851.00	\$0.00	\$109,851.00
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32. How was the IDC Base calculated?

33. Is equipment authorized to be furnished by EPA or leased, purchased, or rented with EPA funds? ☐ Yes ☒ No
(Identify all equipment costing \$1,000 or more)

34. Are any of these funds being used on Procure/Assistance agreements? ☒ Yes ☐ No

Type of Procure/Assistance Agreement Contract

Contractor/Recipient Name (if known)	Total Procure/Assistance Amount Under This Project	Percent Funded by EPA (if known)
TBD	21715 Total \$ 21,715.00	0

Part III - Funding Methods and Billing Instructions

35.	(Note: EPA Agency Location Code (ALC) - 68010727)
<input type="checkbox"/> Disbursement Agreement	Request for repayment of actual costs must be itemized on SF 1080 and submitted to the Financial Management Office, Cincinnati, OH 45268-7002:
<input type="checkbox"/> Repayment	<input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Upon Completion of Work
<input type="checkbox"/> Advance	Only available for use by Federal agencies on working capital fund or with appropriate justification of need for this type of payment method. Unexpended funds at completion of work will be returned to EPA. Quarterly cost reports will be forwarded to the Financial Management Center, EPA, Cincinnati, OH 45268-7002.
<input type="checkbox"/> Allocation Transfer-Out	Used to transfer obligational authority or transfer of function between Federal agencies. Must receive prior approval by the Office of Comptroller, Budget Division, Budget Formulation and Control Branch, EPA Hdqtrs. Forward appropriate reports to the Financial Reports and Analysis Branch, Financial Management Division, PM-226F, EPA, Washington, DC 20460.
36. <input checked="" type="checkbox"/> Reimbursement Agreement <input type="checkbox"/> Allocation Transfer-In	<input checked="" type="checkbox"/> Repayment <input type="checkbox"/> Advance

Other Agency's Billing Address (include ALC or Station Symbol Number)
00008522

Other Agency's Billing Instructions and Frequency

Forward copies of the acceptance and all contract mods to
Matt Seaman: matthew.w.seaman2.civ@mail.mil

Other Agency TAS A2ABM

Part IV - Acceptance Conditions

EPA Identification Number

RW-097-92434401 - 0

37. Terms and Conditions, when included, are located at the end of the 1610-1, or as an attachment.

Part V - Offer and Acceptance

Note: A) For Fund-out actions, the agreement/amendment must be signed by the other agency official in duplicate and one original returned to the Grants and IA Management Division for Headquarters agreements or to the appropriate EPA Regional IA administration office within 3 calendar weeks after receipt or within any extension of time that may be granted by EPA. The agreement/amendment must be forwarded to the address cited in item 29 after acceptance signature.

Failure to return the properly executed document within the prescribed time may result in the withdrawal of offer by EPA. Any change to the agreement/amendment by the other agency after the document is signed by the EPA Award Official, which the Award Official determines to materially alter the agreement/amendment, shall void the agreement/amendment.

B) For Funds-In actions, the other agency will initiate the action and forward two original agreements/amendments to the appropriate EPA program office for signature. The agreements/amendments will then be forwarded to the appropriate EPA IA administration office for signature on behalf of the EPA. EPA will return one original copy after acceptance returned to the other agency after acceptance.

EPA IA Administration Office (for administrative assistance)

EPA Program Office (for technical assistance)

38. Organization/Address

39. Organization/Address

U.S. Environmental Protection Agency
IASSC East
1200 Pennsylvania Avenue, NW Mail code 3903R
Washington, DC 20460

US Environmental Protection Agency
ORD - Office of Research and Development
109 T.W. Alexander Drive
Research Triangle Park, NC 27711

Award Official on Behalf of the Environment Protection Agency

40. Digital signature applied by EPA Award Official | FOR Frank N. Roth - Chief

Date

Michelle Messick - AO delegate

07/30/2015

Authorizing Official on Behalf of the Other Agency

41. Signature

Typed Name and Title

Date

ELMASRI, BISHARA S.
1228842563

Digitally signed by ELMASRI, BISHARA S. 1228842563
DN: cn=EPA, ou=US Government, ou=ORD, ou=HQ,
ou=ORD, cn=ELMASRI, BISHARA S. 1228842563
Date: 2015.07.30 12:46:28 -0400

Bishara Elmasri, Assistant Project Management Officer

7/30/2015

Administrative Conditions

1. Resolution of Disagreements

Should disagreements arise on the interpretation of the provisions of this agreement or amendments and/or revisions thereto, that cannot be resolved at the operating level, the area(s) of disagreement shall be stated in writing by each party and presented to the other party for consideration. If agreement or interpretation is not reached within 30 days, the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution.

If a dispute related to funding remains unresolved for more than 30 calendar days after the parties have engaged in an escalation of the dispute, disputes will be resolved in accordance with instructions provided in the Treasury Financial Manual (TFM) Volume I, Part 2, Chapter 4700, Appendix 10, available at <http://www.fms.treas.gov/tfm/index.html>.

2. Cost Collection Upon Cancellation

If the IA recipient cancels the agreement, the Environmental Protection Agency is authorized to collect costs incurred prior to the cancellation of the agreement, plus termination costs, up to the total payment amount provided for under the agreement.

Programmatic Conditions

Standard IATerms and Conditions

MILITARY INTERDEPARTMENTAL PURCHASE REQUEST					1. PAGE 1 OF 2 PAGES	
2. FSC		3. CONTROL SYMBOL NO.		4. DATE PREPARED 07 MAY 2015		5. MIPR NUMBER 10697000
7. TO: ENVIRONMENTAL PROTECTION AGENCY 26 MARTIN LUTHER KING DR CINCINNATI, OH 45220-2242 Tel:				8. FROM: (Agency, name, telephone number of originator) PD JOINT SERVICES ATTN: MATTHEW SEAMAN BUILDING 1 ANNEX (W90Z7P) Picatinny Arsenal, NJ 07806 Tel:		
9. ITEMS <input type="checkbox"/> ARE <input checked="" type="checkbox"/> ARE NOT INCLUDED IN THE INTERSERVICE SUPPLY SUPPORT PROGRAM AND REQUIRED INTERSERVICE SCREENING <input type="checkbox"/> HAS <input checked="" type="checkbox"/> HAS NOT BEEN ACCOMPLISHED.						
ITEM NO a	DESCRIPTION (Federal stock number, nomenclature, specification and/or drawing no.) b	QTY c	UNIT d	ESTIMATED UNIT PRICE e	ESTIMATED TOTAL PRICE f	
001	EPA - RFAAP OBG Testing Funding provided to U.S. EPA's Office of Research and Development to support air quality sampling of open burning at Radford Army Ammunition Plant (RFAAP.) Copy of SOW provided under separate cover. Estimates for each cost item are: supplies \$12,080, contract analyses \$11,715, travel \$10,820, fabrication \$5,000, contract support \$10,000, in-house Fed labor \$44,139, and indirect costs \$16,097. This Economy Act Order is issued IAW DFAS-IN-37-1 Chapter 12 and 31 USC 1535. Period of Performance ends 28 Feb 2016. Funds expire for obligation 30 Sep 2017. The interagency agreement is currently in draft; a signed copy will be provided to PD Joint Services. EPA Fin POCs: Francis Roth, 202-564-5311, Roth.francis@epa.gov; EPA Tech POC: Brian Gullett, 919-541-1534, gullett.brian@epa.gov; PD JS Tech POC: Gabriela Dory, 973-724-5746, gabriela.a.dory.civ@mail.mil; PD JS	1.000		109,851.00	109,851.00	
THIS MIPR MUST BE ACCEPTED AS RECEIVED ELSE IT SHOULD BE REJECTED.						
10. SEE ATTACHED PAGES FOR DELIVERY SCHEDULES, PRESERVATION AND PACKAGING INSTRUCTIONS, SHIPPING INSTRUCTIONS AND INSTRUCTIONS FOR DISTRIBUTION OF CONTRACTS AND RELATED DOCUMENTS.						11. GRAND TOTAL 109,851.00
12. TRANSPORTATION ALLOTMENT (Used if FOB Contractor's plant)				13. MAIL INVOICE TO (Payment will be made by) DFAS-INDY VP GFEBS 8899 E 56TH STREET INDIANAPOLIS IN 46249-3800 PAY OFFICE DODAAD		
14. FUNDS FOR PROCUREMENT ARE PROPERLY CHARGEABLE TO THE ALLOTMENTS SET FORTH BELOW. THE AVAILABLE BALANCES OF WHICH ARE SUFFICIENT TO COVER THE ESTIMATED TOTAL PRICE.						
ACRN	APPROPRIATION	LIMIT/ SUBHEAD	SUPPLEMENTAL ACCOUNTING CLASSIFICATION		ACCTG STA DODAAC	AMOUNT
	02120152017 2034000		A5XBG EP1200ARE04 253F 0010697000 A.0022230.1.19 0030005256		021001	109,851.00
15. AUTHORIZING OFFICER (Type name and title) MATTHEW SEAMAN				16. SIGNATURE		17. DATE 07 MAY 2015

MILITARY INTERDEPARTMENTAL PURCHASE REQUEST					1. PAGE 2 OF 2 PAGES	
2. FSC		3. CONTROL SYMBOL NO.		4. DATE PREPARED 07 MAY 2015		5. MIPR NUMBER 10697000
6. AMEND NO BASIC						
7. TO: ENVIRONMENTAL PROTECTION AGENCY 26 MARTIN LUTHER KING DR CINCINNATI, OH 45220-2242 Tel:				8. FROM: (Agency, name, telephone number of originator) PD JOINT SERVICES ATTN: MATTHEW SEAMAN BUILDING 1 ANNEX (W90Z7P) Picatinny Arsenal, NJ 07806 Tel:		
9. ITEMS <input type="checkbox"/> ARE <input checked="" type="checkbox"/> ARE NOT INCLUDED IN THE INTERSERVICE SUPPLY SUPPORT PROGRAM AND REQUIRED INTERSERVICE SCREENING <input type="checkbox"/> HAS <input checked="" type="checkbox"/> HAS NOT BEEN ACCOMPLISHED.						
ITEM NO a	DESCRIPTION (Federal stock number, nomenclature, specification and/or drawing no.) b			QTY c	UNIT d	ESTIMATED UNIT PRICE e
ESTIMATED TOTAL PRICE f						
<p>Fin POC: Matt Seaman, 973-724-3311, matthew.w.seaman2.civ@mail.mil</p>						
THIS MIPR MUST BE ACCEPTED AS RECEIVED ELSE IT SHOULD BE REJECTED.						
10. SEE ATTACHED PAGES FOR DELIVERY SCHEDULES, PRESERVATION AND PACKAGING INSTRUCTIONS, SHIPPING INSTRUCTIONS AND INSTRUCTIONS FOR DISTRIBUTION OF CONTRACTS AND RELATED DOCUMENTS.						11. GRAND TOTAL 109,851.00
12. TRANSPORTATION ALLOTMENT (Used if FOB Contractor's plant)				13. MAIL INVOICE TO (Payment will be made by) DFAS-INDY VP GEBS 8899 E 56TH STREET INDIANAPOLIS IN 46249-3800 PAY OFFICE DODAAC		
14. FUNDS FOR PROCUREMENT ARE PROPERLY CHARGEABLE TO THE ALLOTMENTS SET FORTH BELOW. THE AVAILABLE BALANCES OF WHICH ARE SUFFICIENT TO COVER THE ESTIMATED TOTAL PRICE.						
ACRN	APPROPRIATION	LIMIT/ SUBHEAD	SUPPLEMENTAL ACCOUNTING CLASSIFICATION		ACCTG STA DODAAC	AMOUNT
	02120152017 2034000		A5XBG EP1200ARE04 253F 0010697000 A.0022230.1.19 0030005256		021001	109,851.00
15. AUTHORIZING OFFICER (Type name and title) MATTHEW SEAMAN				16. SIGNATURE SEAMAN.MATTHEW.W.12691 66840 <small>Digitally signed by SEAMAN.MATTHEW.W.1269166840 DN: cn=SEAMAN.MATTHEW.W.1269166840, ou=USDA, c=US, email=SEAMAN.MATTHEW.W.1269166840@usda.gov</small>		17. DATE 07 MAY 2015

ACCEPTANCE OF MIPR

1. TO (Requiring Activity Address - Include ZIP Code) PD JOINT SERVICES ATTN: MATTHEW SEAMAN BUILDING 1 ANNEX (W90Z7P) Picatinny Arsenal, NJ 07806 Tel:			2. MIPR NUMBER 10697000		3. AMENDMENT NO. BASIC
			4. DATE (MIPR Signature Date)	5. AMOUNT (As listed on the MIPR)	
6. The MIPR identified above is accepted and the items requested will be provided as follows: (Check as Applicable)					
a. <input type="checkbox"/> ALL ITEMS WILL BE PROVIDED THROUGH REIMBURSEMENT (Category I)					
b. <input type="checkbox"/> ALL ITEMS WILL BE PROCURED BY THE DIRECT CITATION OF FUNDS (Category II)					
c. <input type="checkbox"/> ITEMS WILL BE PROVIDED BY BOTH CATEGORY I AND CATEGORY II AS INDICATED BELOW					
d. <input type="checkbox"/> THIS ACCEPTANCE, FOR CATEGORY I ITEMS, IS QUALIFIED BECAUSE OF ANTICIPATED CONTINGENCIES AS TO FINAL PRICE, CHANGES IN THIS ACCEPTANCE FIGURE WILL BE FURNISHED PERIODICALLY UPON DETERMINATION OF DEFINITIZED PRICES, BUT PRIOR TO SUBMISSION OF BILLINGS.					
7. <input type="checkbox"/> MIPR ITM NUMBER(S) IDENTIFIED IN BLOCK 13, "REMARKS" IS NOT ACCEPTED (IS REJECTED) FOR THE REASONS INDICATED.					
8. TO BE PROVIDED THROUGH REIMBURSEMENT CATEGORY I			9. TO BE PROCURED BY DIRECT CITATION OF FUNDS CATEGORY II		
ITEM NO a.	QUANTITY b.	ESTIMATED PRICE c.	ITEM NO a.	QUANTITY b.	ESTIMATED PRICE c.
THIS MIPR MUST BE ACCEPTED AS RECEIVED ELSE IT SHOULD BE REJECTED.					
d. TOTAL ESTIMATED PRICE			e. TOTAL ESTIMATED PRICE		
10. ANTICIPATED DATE OF OBLIGATION FOR CATEGORY II ITEMS			11. GRAND TOTAL ESTIMATED PRICE OF ALL ITEMS		
12. FUNDS DATA (Check if applicable)					
a. <input type="checkbox"/> ADDITIONAL FUNDS IN THE AMOUNT OF \$ _____ ARE REQUIRED (See justification in Block 13)					
b. <input type="checkbox"/> FUNDS IN THE AMOUNT OF \$ _____ ARE NOT REQUIRED AND MAY BE WITHDRAWN					
13. REMARKS					
14. ACCEPTING ACTIVITY (Complete Address)			15. TYPED NAME AND TITLE OF AUTHORIZED OFFICIAL FRANCIS ROTH, CHIEF FISB/GIARD		
			16. SIGNATURE Michelle Messick		17. DATE 7/30/15

DD FORM 448-2, JUL 71 (EG)

PREVIOUS EDITIONS WILL BE USED UNTIL EXHAUSTED

APPENDIX CROSSWALK

APPROPRIATION	LIMIT/ SUBHEAD	SUPPLEMENTAL ACCOUNTING CLASSIFICATION					ACCTG/ STA DOAAC	Amount
02120112011 2020000 (1)	(2)	A2ABM (3)	131096QLG (4)	2540 (5)	0010009238 (6)	2ABM0150 (7)	021001 (8)	\$1,000 (9)

FIELD LOA	POSITION	REPRESENTS	SFIS ELEMENT	GFEBs	LEGACY
1	1-3	Dept Code	A1	021	21
	4-11	Fiscal Year / Period of Availability	A8	20112011	1 (1 year)
	12-15	Appropriation	A3	2020	2020
	16-18	Sub-Account Code	A4	000	NA
2	19-22**	Limit		Blank or XXXX**	XXXX
3	23-27	Fund Center	CA1	A2ABM	-
	(23-25)	Operating Agency		A2ABM	2A
	(26-27)	ASN		A2ABM	2ABM
4	28-39**	Functional Area	B1/B2/B3	131096QLOG	-
	(28-33)	AMSCO		131096QLOG	131096
	(34-37)	MDEP		131096QLOG	QLOG
5	40-43	OMB Object Class Code/EOR	B6	254	2540
6	44-53	GFEBs PR#		0010009238	-
7	54-63***	Cost Object (WBS/IO/Cost Center)	CA6	(WBS) 300100.001 or (IO) 100001093 or (CC) 2ABM0150	NA
8	64-69	Fiscal Station Number	O3	021001	021001
9	-	Amount	T7	1,000.00	1,000.00

*Depends on appropriation. For example, "2020" does not have a limits in SFIS; "0300" has a limits.
 **The fund used will determine how many characters there are for the functional Area (AMSCO/MDEP), but
 could be as few as or many as 12.
 ***The position could be shorter or longer based on the length of the WBS or IO

Scope of Work

Air Quality Sampling of Open Burning at the Radford Army Ammunition RFAAP

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Introduction

The Radford Army Ammunition Plant (RFAAP) conducts on-site disposal of Mark 90 rocket motors via open burn pans. Data on potential combustion emissions and emission factors are available only from testing elsewhere. Some of these data are derived from small laboratory and pilot scale simulations and their relevance to the RFAAP's scenario has been questioned. To resolve this issue, the RFAAP has asked the U.S. EPA's Office of Research and Development (ORD) to submit this proposal for sampling and quantification of emissions. ORD has considerable experience sampling emissions from open burning and open detonation (OB/OD) of military ordnance and static firing of rocket motors (for example, see Aurell et al, 2015).

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15 Since 2010 ORD has worked with the DoD's Joint Munitions Command (and their predecessor, the Defense Ammunition Center), the Army Corps of Engineers, and the Defence Research and Development Canada -Valcartier to sample OB/OD emissions at three RFAAP sites in the US and Canada. ORD has developed a suite of technologies for sampling an array of OB/OD emission

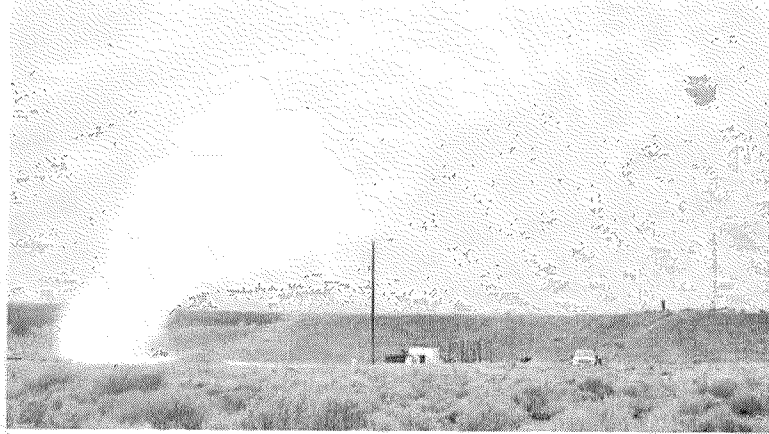


Figure 1. Open burns of propellant at Tooele RFAAP.
Aerostat/Flyer sampling of emissions.

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constituents from both aerial (Figure 1) and ground-based sampling platforms. This Scope of work covers application of these sampling technologies towards quantification of the RFAAP's open burn emissions.

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Method

ORD will conduct aerial sampling of emissions from Mark 90 rocket motor burns and their associated "Skid" or "Pit" waste. Ten total days of sampling will allow five days for the Mark 90s and five days for the Skid waste. Since the Mark 90 composition is constant and that of the Skid waste is variable, emission sampling for the latter will provide only a representative range of emission quantification. As Skid waste contains chlorine and the Mark 90s do not, Cl-related sampling will only be conducted on the Skid waste. The RFAAP will provide ORD with

35

composition (carbon, energetic, metals) and mass data on the disposal material to enable calculation of emission factors from their sampling data.

Targeted emission constituents and their sampling methods are listed in Table 1.

Table 1A. Mark 90 Tests

Analyte	Method	Frequency	Minimum # of Samples
Mark 90			
CO ₂	NDIR	Continuous	
CO	Electrochemical cell	Continuous	
PM _{2.5}	Impactor/filter/gravimetric	Batch	15
NG	Quartz Filter, HPLC	Batch	6
Pb, other metals	Filter, XRF	Batch	6
Cr (III, VI),	Filters, NIOSH 76057300	Batch	3

Table 1B: Skid Waste Tests

Analyte	Method	Frequency	Minimum # of Samples
Skid Waste			
CO ₂	NDIR	Continuous	
CO	Electrochemical cell	Continuous	
PM _{2.5}	Impactor/filter/gravimetric	Batch	15
NG	Quartz Filter, HPLC	Batch	6
Pb, other metals	Filter, XRF	Batch	5
Cr (III, VI)	Filters, NIOSH 76057300	Batch	3
Perchlorate	MCE filter/LCMS	Batch	5
Chloride	MCE filter/Ion Chrom.	Batch	5
HCl	Na ₂ CO ₃ filter/Ion Chrom.	Batch	5
Dioxins	Quartz filter/HRMS	Batch	2

Efforts will attempt to gather the minimum number of samples as indicated in Table 1 of each batch emission constituent to provide for statistical confidence. As time, site logistics, weather, and sampling dictates, additional samples will be taken. While the goal is to gather samples that sufficiently exceed analyte detection limits, the desired sampling volume to achieve this cannot be known a priori, as this would require knowledge of the emission factor itself. ORD's best engineering judgment based on similar past sampling, along with a cumulative carbon counter to reflect the plume concentration observed by the sampler, will be used to estimate

the necessary and sufficient sampling time/volume. The limiting constituent will likely be the trace dioxin and next the nitroglycerin, requiring the longer sampling time/volume.

Aerial sampling will be conducted by an unmanned aerial system (UAS, see Figure 2 for an example) operated by a DoD contractor (ISSI, Inc.) at a height of less than 500 feet, will not extend beyond the boundaries of the RFAAP, and will be in visual contact with ground observers at all times. These parameters will be strictly adhered to as the site (Figure 3) is physically constrained by the river on one side, a tree-covered ridge on the parallel side, and a utility pole line down the center.

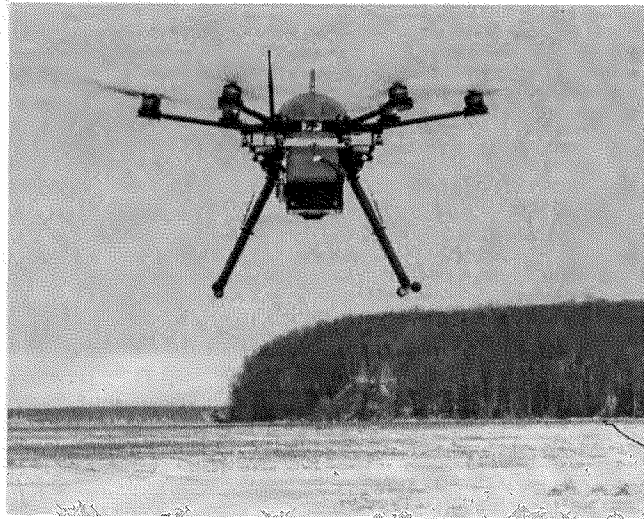


Figure 2. Univ. Alaska - Fairbanks hexacopter with ORD sensor/sampler payload. Detonation plume sampling at Joint Base Elmendorf-Richardson, February 2015.

We anticipate sampling to occur during at least two series of eight pan burns throughout each day. Observation points at both ends of the pan line and in the midpoint of the ridge will allow for visual observation of the plume and coordinating the optimal position of the sampler. As there may be advantage in collecting emissions from smaller burns, we understand that the RFAAP has permission from the State of Virginia to vary their burn prescription (number of pans, amount of material) for optimal sampling.

Prior to conducting measurements, ORD will develop a Quality Assurance Project Plan (QAPP) for RFAAP and internal QA staff review.



Figure 3. Overhead view of Radford burn pan site.

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Mechanism

This work is proposed to be conducted by ORD, an Air Force Research Laboratory (AFRL) contractor (University of Dayton Research Institute, UD), and a NAVAIR contractor (ISSI, Inc.). Each can receive funding through a separate MIPR and have done so in the past from, variously, SERDP, Natick, and the Air Force Institute of Technology (AFIT). ORD will attach their received MIPR to an Interagency Agreement for ORD and Army signatures, allowing ORD to accept the funds. The University of Dayton is represented by Dr. Johanna Aurell, currently a visiting scientist at ORD and a former post-doctoral student of Dr. Gullett's. Dr. Aurell is the chief designer and operator of the sampling system and is responsible for field sampling instruments. ISSI, Inc. supplies and operates the aerial platform for the sampling instruments and has done so for four OB/OD campaigns with ORD. Dr. Gullett will oversee the project effort and coordinate amongst the RFAAP, ISSI, and UD. He is responsible for the overall conduct and output of the project.

Strawman Schedule

Date	Activity
April 17, 2015	MIPR received at ORD, AFRL, and NAVSEA
May 22, 2015	IA approved
June 12, 2015	Funding available at ORD
July 10, 2015	QAPP approved
July 27, 2015	Sampling commences
August 7, 2015	Sampling concludes
September 4, 2015	Sample analysis complete
September 30, 2015	Draft final report submitted to RFAAP

Output

The output of this effort will include a final report to be reviewed by both ORD and the RFAAP. With the participation and authorship of the RFAAP, a journal paper and/or conference paper are also anticipated.

Budget

Participant	Cost
ORD	\$109,851
AFRL (UDayton)	\$41,000
NAVAIR (ISSI, Inc.)	\$48,000

TOTAL	\$198,851
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110 References

Aurell, J.; Gullett, B.K.; Tabor, D.; Williams, R.K.; Mitchell, W.; Kemme, M.R.; Aerostat-based sampling of emissions from open burning and open detonation of military ordnance, J. Haz Mat 284: 108-120, 2015