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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0305913F I NUDET Detection System (SPACE)							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	42.506	20.405	14.447	-	14.447	18.785	24.253	13.898	14.147	Continuing	Continuing
672808: Nuc Detonation Det Sys (sensors)	-	42.506	20.405	14.447	-	14.447	18.785	24.253	13.898	14.147	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The United States Nuclear Detonation (NUDET) Detection System (USNDS) provides a near real-time worldwide, highly survivable/endurable capability to detect, locate, and report any nuclear detonations in the earth's atmosphere or in near space. USNDS supports NUDET detection requirements across five mission areas: Integrated Tactical Warning and Attack Assessment (ITW/AA), Nuclear Force Management (NFM), Space Control (SC), Treaty Monitoring (TM), and a classified mission.

The USNDS program is jointly sponsored and funded by the Department of Defense (DoD), through the US Air Force (AF), and the Department of Energy (DOE), through the National Nuclear Security Administration (NNSA) and its Nuclear Detonation Detection (NA-22) office, respectively. NNSA/NA-22 supplies, at no cost to DoD, USNDS space sensors as Government Furnished Equipment (GFE) to the AF's USNDS Program Office, which is responsible for all acquisition and systems engineering, integration and test (SEIT) activities on space vehicles (SVs), to include Global Positioning System (GPS) and additional hosts, and their supporting ground control segments. The AF directly funds the development of the USNDS ground segment (described below).

DoD funds their contribution to the NDS program in Program Element (PE) 0305913F with RDT&E, OPAF and O&M dollars.

USNDS consists of space sensors and complex ground segments. The space segment sensors, funded by DOE, consists of three nuclear detection sensor payloads: the Radiation Detection Capability (RADEC) payload for Defense Support Program (DSP) satellites, the Global Burst Detection (GBD) payload for Medium Earth Orbit (MEO) platforms (GPS satellites), and the Space Atmospheric Burst Reporting System (SABRS) payload for Geosynchronous Earth Orbit (GEO) platforms (classified GEO host). Together, these sensors and associated communications capability provided by the host satellites comprise the global NUDET space segment detection capability for the USNDS. Space sensors communicate NUDET indications to the fixed ground segment (the RADEC Data Processor (RDP) and the Integrated Correlation and Display System (ICADS)), the deployable mobile ground segment (survivable Ground NDS Terminals (GNTs)), and the survivable/endurable Universal Ground NDS Terminals (UGNTs), when fielded. These ground systems perform data analysis and provide a decision support tool to the Air Force controllers concerning probability of NUDET occurrence. The ground segment provides ground receiving analysis and reporting capabilities to national authorities, commands, and forward users as well as Department of State (DOS) for Treaty Monitoring and Verification mission. The ground control segment is being modernized and continuously improved through an incremental evolution acquisition approach.

The upgrade to the GNT is the survivable/endurable Universal Ground Nuclear Detonation (NUDET) Detection System (NDS) Terminal (UGNT) which is funded with AF RDT&E in this PE. The UGNT provides NUDET Detection Reports to end users through survivable and endurable USNDS communications via Milstar/Advanced Extremely High Frequency (AEHF) circuits. The GNT supports ITW/AA and NFM missions. The UGNT program modifies the baseline of the GNT program and deploys

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as an integral part of the Space Based Infrared System (SBIRS) Survivable / Endurable Evolution (S2E2) Mobile Ground System (SMGS) units also in support of ITW/AA and NFM. The UGNT, when integrated with the SMGS, will perform NUDET event processing with fused NDS data from GPS and DSP. SMGS capability refers to the result of the S2E2 upgrade program for the MGS mission processing capability, including the integration of UGNT. The intended end state of UGNT integration is delivery of enhanced missile warning and NUDET detection capabilities that meet survivable/endurable ITW/AA requirements directed by the President, SECDEF, Joint Staff, and USSTRATCOM, delivering long-term, cost effective, multi-role, multi-mission space effects to the war fighter across the range of military operations.						
This budget line includes systems engineering, research and development, on-orbit and field testing and end-to-end verification of USNDS space sensors, ground analysis and reporting systems in support of the five USNDS mission areas. Sensor integration for GPS IIF and GPS III are funded in their respective PEs.						
This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.						
B. Program Change Summary (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget		42.506	20.468	6.444	-	6.444
Current President's Budget		42.506	20.405	14.447	-	14.447
Total Adjustments		-	-0.063	8.003	-	8.003
• Congressional General Reductions		-	-0.063			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-	-			
• SBIR/STTR Transfer		-	-			
• Other Adjustments		-	-	8.003	-	8.003
Change Summary Explanation						
FY16: +\$8.003M to fund SBIRS mobile UGNT.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2014	FY 2015	FY 2016
Title: ICADS				20.708	6.843	-
Description: Satellite ground data processing system that reports endo-atmospheric, transition and near-space nuclear detonations (NUDETs) as detected by the NDS sensors aboard the GPS and DSP satellites and SABRS equipped satellites.						
FY 2014 Accomplishments:						

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
ICADS Build 6 Delivery 1 ITW/AA Certified. Delivery 2 completed Developmental Test & Evaluation (DT&E).				
FY 2015 Plans: Complete ITW/AA certification for ICADS Delivery 2. Operational delivery of ICADS Build 6 Delivery 2 to support GPS III SVs 01-08.				
Title: UGNT Description: Delivers enhanced missile warning and NUDET detection capabilities that meet survivable/endurable tactical warning and attack assessment requirements directed by the President, SECDEF, Joint Staff and USSTRATCOM delivering long-term, cost effective, multi-role, multi-mission space effects to the war fighter across the range of military operations. FY 2014 Accomplishments: Completed UGNT hardware and software development, delivered Testbed, completed Critical Design Review (CDR) and began integration of hardware and software into the first two UGNT shelters. FY 2015 Plans: Continue integration of 2 UGNT shelters. Complete contractor DT&E of 2 UGNT shelters for delivery for initial S2E2 integration in 1QFY16. FY 2016 Plans: Complete integration and deliver 2 UGNT trailers to S2E2. Begin final testing and integration of hardware and software into the third UGNT trailer.		10.942	5.122	8.660
Title: Systems Engineering/On-Orbit Support & Testing Description: Support costs include such activities as, on-orbit NDS sensor integration, check-out/support, testing and system engineering. FY 2014 Accomplishments: Provided SE&I, technical support and program technical support for the five NDS mission areas, supported GPS IIF-5, IIF-6 and IIF-7 integration and checkout of NDS sensors during launch and on-orbit activities. FY 2015 Plans: Provide SE&I, technical support and program technical support for the five NDS mission areas. Deliver GBD for GPS III SV03 and support SV integration activities. Support GPS IIF-8, IIF-9 and IIF-10 integration checkout of NDS sensors during launch and on-orbit activities. FY 2016 Plans:		10.856	8.440	5.787

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C. Accomplishments/Planned Programs (\$ in Millions)										FY 2014	FY 2015	FY 2016
Provide SE&I, technical support and program technical support for the five NDS mission areas. Deliver GBD for GPS III SV04, SV05, and support SV integration activities. Support to GPS IIF 11 and 12, integration checkout of NDS sensors during launch and on-orbit activities.												
Accomplishments/Planned Programs Subtotals										42.506	20.405	14.447
D. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost	
• OPAF: BA03: Line Item # 836750: <i>Nudet Detection Sys Space</i>	4.415	4.656	5.095	-	5.095	4.432	6.405	6.519	6.634	Continuing	Continuing	
Remarks												
E. Acquisition Strategy												
The USNDS Acquisition Strategy is to develop, integrate, field and sustain USNDS satellite sensors and USNDS ground data processing and distribution hardware and software as well as mission operational and technical program support to sustain the USNDS capability on GPS and DSP; funding is sent by Military Interdepartmental Purchase Request (MIPR) from DoD and Department of Energy (DOE) to Sandia, Lawrence Livermore, and Los Alamos National Laboratories and other agencies on existing DOE/National Nuclear Security Administration (NNSA) contracts.												
F. Performance Metrics												
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0305913F / NUDET Detection System (SPACE)				Project (Number/Name) 672808 / Nuc Detonation Det Sys (sensors)					
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ICADS and GNT/UGNT	MIPR	Sandia National Laboratory : Albuquerque, NM	-	31.650	Nov 2013	11.965	Nov 2014	8.660	Nov 2014	-		8.660	Continuing	Continuing	-
SABRS	MIPR	Various : Various,	-	-		-		-		-		-	-	-	-
Completed NDS Development Efforts	Various	Various : Various	-	-		-		-		-		-	-	-	-
SE&I	C/CPAF	SAIC : San Diego, CA	-	1.516	Dec 2013	1.414	Dec 2014	1.460	Dec 2014	-		1.460	Continuing	Continuing	-
Subtotal			-	33.166		13.379		10.120		-		10.120	-	-	-
Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Testing	Various	17th Test Squadron, JITC : Schriever AFB, CO	-	0.377	Dec 2013	0.267	Dec 2014	0.477	Dec 2015	-		0.477	Continuing	Continuing	-
On-orbit Sensor Testing	MIPR	Various : LANL, SNL, NM	-	2.652	Mar 2014	2.959	Mar 2015	1.700	Mar 2016	-		1.700	Continuing	Continuing	-
Subtotal			-	3.029		3.226		2.177		-		2.177	-	-	-

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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	Various	Aerospace, MITRE : El Segundo, CA	-	2.935	Nov 2013	2.424	Nov 2014	1.101	Nov 2015	-		1.101	Continuing	Continuing	-
Program Management Administration	Various	Various : Various,	-	3.376	Nov 2013	1.376	Nov 2014	1.049	Nov 2015	-		1.049	Continuing	Continuing	-
Subtotal			-	6.311		3.800		2.150		-		2.150	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	42.506	20.405	14.447	-	14.447	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force			Date: February 2015		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0305913F / NUDET Detection System (SPACE)			Project (Number/Name) 672808 / Nuc Detonation Det Sys (sensors)

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
UGNT 1 Integration & Delivery																												
UGNT Maintenance/Training System Delivery																												
ICADS GPS III & LCS/OCX Delivery																												
UGNT 2 Integration & Delivery																												
UGNT Test Readiness Review																												
UGNT 1&2 to SBIRS Mobile Ground System																												
UGNT 3 Integration & Delivery																												
UGNT 3 to SBIRS Mobile Ground System																												
UGNT 4-5 Integration & Delivery																												
UGNT Initial Operations Capability																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
UGNT 1 Integration & Delivery	3	2014	1	2016
UGNT Maintenance/Training System Delivery	4	2014	3	2015
ICADS GPS III & LCS/OCX Delivery	3	2015	4	2015
UGNT 2 Integration & Delivery	4	2015	2	2016
UGNT Test Readiness Review	4	2015	1	2016
UGNT 1&2 to SBIRS Mobile Ground System	2	2016	2	2016
UGNT 3 Integration & Delivery	1	2016	1	2017
UGNT 3 to SBIRS Mobile Ground System	1	2017	2	2017
UGNT 4-5 Integration & Delivery	1	2018	4	2018
UGNT Initial Operations Capability	1	2019	1	2019