Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force											Date: March 2014	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305913F / *NUDET Detection System (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	58.074	42.506	20.468	-	20.468	6.444	4.230	13.756	14.016	Continuing	Continuing
672808: *Nuc Detonation Det Sys (sensors)*	-	58.074	42.506	20.468	-	20.468	6.444	4.230	13.756	14.016	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305913F / *NUDET Detection System (SPACE)*

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 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 it supports operational systems.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	64.965	50.547	20.724	-	20.724
Current President's Budget	58.074	42.506	20.468	-	20.468
Total Adjustments	-6.891	-8.041	-0.256	-	-0.256
• Congressional General Reductions	-0.083	-0.041			
• Congressional Directed Reductions	-1.600	-8.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments	-5.208	-	-0.256	-	-0.256

Change Summary Explanation

FY13: -$1.600M congressional reduction; -$5.208M sequestration reduction
FY14: -$8.000M congressional reduction
FY15: -$0.256M Non-Pay Inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: ICADS	26.232	24.708	6.906
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.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305913F / *NUDET Detection System (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
FY 2013 Accomplishments: Operational acceptance and turn-over of ICADS Build 6 Delivery 1 (SABRS and GPS IIF backward compatibility). Verified ground segment (ICADS) capabilities to operate the first operational SABRS. Continued ICADS hardware and software development for the GPS III SVs 01-08 and LCS/OCX Interface upgrade to Build 6, also known as Delivery 2. ***FY 2014 Plans:*** Continue ICADS hardware and software development and testing for Delivery 2 to support GPS III SVs 01-08 and LCS/OCX Interface. ***FY 2015 Plans:*** 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 2013 Accomplishments:*** Completed UGNT Production Readiness Review (PRR) for trailer 1 & 2. ***FY 2014 Plans:*** Continue UGNT hardware and software development, deliver Testbed, complete Critical Design Review (CDR) and begin integration of hardware and software into the first two UGNT shelters. ***FY 2015 Plans:*** Complete integration of 2 UGNT shelters. Complete contractor DT&E of 2 UGNT shelters for delivery for initial S2E2 integration in 1QFY16.	22.527	12.229	8.787
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 2013 Accomplishments:*** Provided SE&I, technical support and program technical support for the five NDS mission areas. Completed integration and checkout of NDS sensors on GPS IIF-3 and IIF-4 during launch and on-orbit activities. Delivered remaining GPS IIF Global	9.315	5.569	4.775

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305913F / *NUDET Detection System (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Burst Detectors (GBDs) and performed integration & test of NDS on IIF. Delivered GPS III SV02 GBD and supported follow-on integration and test activities. ***FY 2014 Plans:*** Provide SE&I, technical support and program technical support for the five NDS mission areas, support GPS IIF-5, IIF-6 and IIF-7 integration and checkout of NDS sensors during launch and on-orbit activities. Deliver GBD for GPS III SV03 and support subsequent SV integration activities. ***FY 2015 Plans:*** 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 GPS IIF-8 and IIF-9 integration checkout of NDS sensors during launch and on-orbit activities.			
Accomplishments/Planned Programs Subtotals	58.074	42.506	20.468

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPAF: BA03: Line Item # 836750: *Nudet Detection Sys Space*	5.185	4.415	4.656	-	4.656	5.129	4.467	6.459	6.575	Continuing	Continuing

Remarks

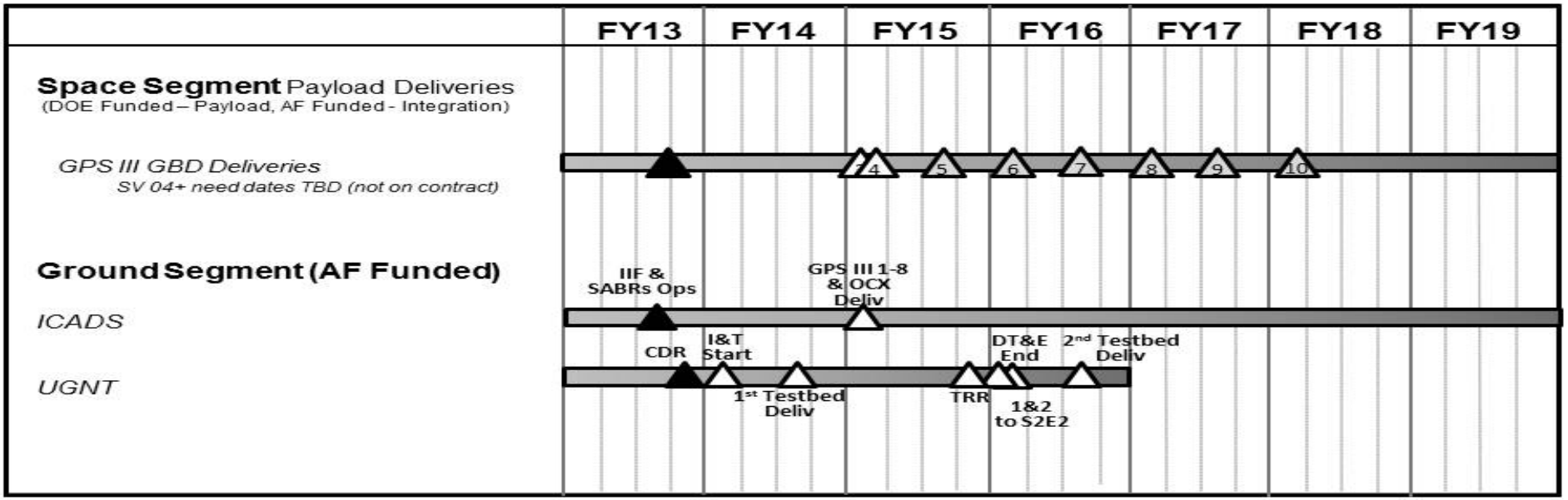
E. Acquisition Strategy

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.

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Air Force		Date: March 2014
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)*



AF – Air Force
CDR – Critical Design Review
DOE – Department of Energy
DT&E – Developmental Test & Evaluation
GBD – Global Burst Detector
I&T – Integration and Test
ICADS – Integrated Correlation and Display System
SABRS – Space Atmospheric Burst Reporting System
TRR – Test Readiness Review
UGNT – Universal Ground NDS Terminal
S2E2 – Survivable and Endurable Evolution