OSD RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE
RDTE, Defense Wide BA 03	**0603745D8Z - Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)**

COST ($ in Millions)		FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
P745	Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)		3.469	7.984	4.953			

A. Mission Description and Budget Item Justification: The Synthetic Aperture Radar (SAR) Coherent Change Detection (CCD) Initiative encompasses four phases to develop deployable systems capable of achieving SAR with real-time Coherent Change Detection for tactical intelligence. Phase I will validate the utility of existing small SAR sensors for use as a CCD platform. CCD post processing will be used to establish current SAR capabilities for change detection thresholds. Phase II will demonstrate real-time CCD on a manned, SAR-equipped, platform. This real-time enhancement will be capable of being retro fitted on existing manned SAR platforms. Phase III will develop the engineering enhancements necessary to integrate a real-time SAR CCD capability on a small UAV. All necessary software will be developed during this phase. Phase IV will extend the capability to an affordable small unmanned aircraft with a miniaturized SAR system. The goal is to develop a deployable system with a SAR sensor capable of achieving real time CCD on a small UAV to be tested by the tactical commander and at a cost of $500 thousand per SAR CCD sensor package.

B. Program Change Summary	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008)		6.500	8.000
Current BES/President's Budget (FY 2009)		3.469	7.984
Total Adjustments		-3.031	-0.016
Congressional Program Reductions		-3.031	
Congressional Rescissions			
Congressional Increases			
Reprogrammings			
SBIR/STTR Transfer			
Other			-0.016

C. Other Program Funding Summary Not applicable for this item.

D. Acquisition Strategy Not applicable for this item.

E. Performance Metrics: Not Applicable.

OSD RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2008

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
RDTE, Defense Wide BA 03	**0603745D8Z - Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)**	**P745**

COST ($ in Millions)		FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
P745	Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)		3.469	7.984	4.953			

A. Mission Description and Budget Item Justification: The Synthetic Aperture Radar (SAR) Coherent Change Detection (CCD) Initiative encompasses four phases to develop deployable systems capable of SAR with real-time Coherent Change Detection processing to provide over the horizon alerts for terrain changes above a given threshold.

Phase I will validate the utility of current small SAR systems for use with CCD processing. CCD post processing will be used to establish current SAR capabilities for change detection thresholds.

Phase II will demonstrate real-time CCD on a manned SAR-equipped platform. This real-time enhancement will be capable of being retrofitted on existing manned SAR platforms.

Phase III will develop the engineering enhancements necessary to integrate a real-time SAR CCD capability on a small UAV. All necessary software will be developed during this phase.

Phase IV will extend the capability to an affordable small unmanned aircraft with a miniaturized SAR system. Phase IV will also decrease procurement costs of a small SAR with a real time CCD capability to $500 thousand per sensor package. This compares to a current cost of approximately $1.2 million for a spot SAR system.

B. Accomplishments/Planned Program:

Accomplishments/Planned Program Title:	FY 2007	FY 2008	FY 2009
Validate the Utility of SAR CCD		0.750	

SAR with real-time CCD will have the ability to detect the following activities with actual detection metrics to be determined and tested during Phase I:
- Vehicle tracks due to a vehicle recently driving off-road, such as across a median strip, or adjacent to a paved road.
- Human(s) having recently traversed a path on soft soil, underbrush or vegetation.
- Detection of linear structures newly-emplaced, such as a small diameter pipe.
- Ground displacement due to trenching or the movement of dirt along a path.
- The addition or subtraction of a significant object visible to the sensor, covering a half square meter, or providing a significant change in radar cross section (reflectivity).
- Ground displacement due to digging operations, or digging and soil replacement, or repaving operations, where the ground area of the displaced earth covers a square meter or more.
- The displacement of guard barriers, or other objects, due to manual manipulation, or vehicle crashes.
- Ground level subsidence due to underground excavation activities when the surface subsidence amounts to a few millimeters.

The first phase will validate the utility of small SAR sensors for use in CCD processing. Phase I will also determine the current actual capabilities of CCD in tactical change detection.

FY 2008 Plan: Validate the utility of small SAR systems with CCD post processing for intelligence gathering. The goal is to develop deployable systems, capable of achieving real-time CCD for tactical intelligence with the objective of deployment in a small UAV to be utilized by the tactical commander.

Accomplishments/Planned Program Title:	FY 2007	FY 2008	FY 2009
Demonstration of a manned platform system		2.719	2.146

Phase II will demonstrate real-time CCD on a manned platform. The objective is to create a real-time CCD solution that may be retrofitted on to current manned SAR platforms.

FY 2008/FY 2009 Plans: This phase will continue with first phase efforts, in addition, will demonstrate a real-time CCD capability on a manned SAR platform system with a radar and processing capability that can produce real-time SAR CCD, together with a design for a deployable objective system.

Accomplishments/Planned Program Title:	FY 2007	FY 2008	FY 2009
Develop the engineering enhancements			5.838

Phase III will develop the engineering enhancements necessary to integrate a miniature SAR with a real-time CCD capability on a small unmanned aircraft.

FY 2009 Plan: This phase will develop the necessary reduction in SAR component size necessary to facilitate integration of real-time CCD systems into a small UAV.

Accomplishments/Planned Program Title:	FY 2007	FY 2008	FY 2009
Extend capability			

The fourth phase will extend a real-time CCD capability to a small unmanned aircraft with a small SAR system for $500 thousand per sensor package.

FY 2010 Plan: This phase of the program will integrate a SAR with real time CCD capability to a small UAV for $500 thousand per sensor package.

C. Other Program Funding Summary Not applicable for this item.

D. Acquisition Strategy Not applicable for this item.

E. Major Performers Not applicable for this item.