OSD RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

Date: February 2007

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE
RDT&E/ Defense Wide BA# 3	**0603745D8Z - Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)**

Cost ($ in Millions)		FY 2006 Actual	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total Program Element (PE) Cost		0.000	0.000	6.500	8.000	5.000	0.000	0.000	0.000
P745	Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	0.000	0.000	6.500	8.000	5.000	0.000	0.000	0.000

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 real time strip SAR with coherent change detection processing imagery for tactical intelligence. The first phase will validate the utility of strip SAR CCD for intelligence gathering and address CONOPS and exploitation approaches. Phase two will overlap in part with the first phase and will demonstrate a manned platform system with radar and processing capability that can produce real time SAR CCD, together with a design for a deployable objective system. Phase three will develop the engineering enhancements necessary for an unmanned aircraft, such as an Air Warrior platform, to integrate a real time strip SAR CDD capability, and develop exploitation tool enhancements. The fourth phase will extend the capability to an affordable Class III unmanned aircraft with a miniaturized SAR system. The goal is to develop deployable systems capable of achieving real time strip SAR with coherent change detection processing imagery for tactical intelligence with the objective of deployment in a UAV to be tested by the tactical commander.

B. Program Change Summary	FY 2006	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2007)				
Current BES/President's Budget (FY 2008/2009)	0.000	0.000	6.500	8.000
Total Adjustments	0.000	0.000	6.500	8.000
Congressional Program Reductions				
Congressional Rescissions				
Congressional Increases				
Reprogrammings				
SBIR/STTR Transfer				
Other			6.500	8.000

C. Other Program Funding Summary: Not Applicable.

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D. Acquisition Strategy: Not Applicable.

E. Performance Metrics: Not Applicable.

OSD RDT&E PROJECT JUSTIFICATION (R2a Exhibit)

Date: February 2007

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
RDT&E/ Defense Wide BA# 3	**0603745D8Z - Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)**	**P745**

Cost ($ in Millions)		FY 2006 Actual	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
P745	Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	0.000	0.000	6.500	8.000	5.000	0.000	0.000	0.000

A. Mission Description and Project Justification: The Synthetic Aperture Radar (SAR) Coherent Change Detection(CCD) Initiative encompasses four phases to develop deployable systems capable of achieving real time strip SAR with coherent change detection processing imagery for tactical intelligence.

Phase one will validate the utility of strip SAR CCD for intelligence gathering and address CONOPS and exploitation approaches.

Phase two will overlap in part with the first phase and will include a demonstration of a manned platform system with radar and processing capability that can produce real time SAR CDD, together with a design for a deployable objective system.

Phase three will develop the engineering enhancements necessary for an unmanned aircraft, such as an Air Warrior platform, to integrate a real time strip SAR CCD capability and develop exploitation tool enhancements.

Phase four will extend the capability to an affordable Class III unmanned aircraft with a new miniaturized SAR system in FY 2010. Phase IV will also decrease procurement costs of a Class III UAV with the strip SAR CCD capability to $500K per platform. This compares to a current cost of approximately $1.2M for a spot SAR system.

B. Accomplishments/Planned Program:

Accomplishment/Planned Program Title	FY 2006	FY 2007	FY 2008	FY 2009
Validate the utility of strip SAR CCD	0.000	0.000	3.500	0.000

Real-time SAR CCD will have the ability to detect and geolocate the following kinds of activities:
- 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 or coaxial cabling;
- Ground displacement due to trench having been dug, or the movement of dirt along a path in order to conceal a length of wire placed along the ground;
- 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;

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- 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 strip SAR CCD for intelligence gathering, and address CONOPS and exploitation approaches.

FY 2008 Plan: Validate the utility of strip SAR CCD for intelligence gathering, and address CONOPS and exploitation approaches. The goal is to develop deployable systems, capable of achieving real time strip SAR, with coherent change detection processing imagery for tactical intelligence with the objective of deployment in a UAV to be tested by the tactical commander.

Accomplishment/Planned Program Title	FY 2006	FY 2007	FY 2008	FY 2009
Demonstration of a manned platform system	0.000	0.000	3.000	0.000

Phase two will overlap in part with the first phase and will demonstration of a manned platform system with radar and processing capability that can produce real time SAR CCD, together with a design for a deployable objective system.

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

Accomplishment/Planned Program Title	FY 2006	FY 2007	FY 2008	FY 2009
Develop the engineering enhancements	0.000	0.000	0.000	4.200

Phase three will develop the engineering enhancements necessary for an unmanned aircraft, such as an Air Warrior platform, to integrate a real time strip SAR CDD capability, and develop exploitation tool enhancements.

FY 2009 Plan: Improved Resolution will detect ground displacements and similar ground features of three millimeters, which is more than an order of magnitude better than the optical or SAR resolution of other current systems. Provide the SAR CCD capability to existing SAR radar systems for an added cost per platform of less than $100 thousand per system.

Accomplishment/Planned Program Title	FY 2006	FY 2007	FY 2008	FY 2009
Extend capability	0.000	0.000	0.000	3.800

The fourth phase will extend the capability to an affordable Class III unmanned aircraft with a miniaturiezed SAR system. Increased Collection Rate - Collection rate for SAR data will be 50 to 100 square kilometers per hour, as opposed to spot SAR capabilities which produce at most several square kilometers per hour.

FY 2009 Plan: This phase of the program will develop engineering enhancements necessary for an unmanned aircraft, such as the Air Warrior platform, to integrate a real time strip SAR CCD capability, and develop exploitation tool enhancements.

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C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Major Performers Not Applicable.