EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766

PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0766 IUSS Detect/ Classif Syst.	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.
X0758 SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.
TOTAL	9,256	19,372	18,025	18,414	27,829	28,225	26,626	21,775	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (P.E.) comprises two projects - X0766 and X0758. Project X0766 provides for Integrated Undersea Surveillance Systems (IUSS) Research and Development Projects. Project X0758 is for the Surveillance Towed Array Sensor (SURTASS) development efforts. IUSS provides the Navy with its primary means of submarine detection both nuclear and diesel. The program has undergone a major transition from emphasis on maintaining a large dispersed surveillance force keyed to detection and tracking of soviet submarines to a much smaller force that is effective against modern diesel and nuclear submarines in regional/littoral or broad ocean areas of interest. This transition preserves the ability to continue open ocean surveillance.

(U) The IUSS Research and Development project (X0766) funds Fixed Surveillance Systems (FSS) which encompasses the Sound Surveillance System (SOSUS), the Surveillance Direction System (SDS), the Fixed Distributed System (FDS) and SURTASS Low Frequency Active (LFA) developments. The number of SOSUS processing sites has been reduced and the display equipment used at the remaining sites will be converted to SDS/SSIPS (Shore Signal and Information Processing Segment) to significantly lower life cycle costs and enable system-wide consolidation. SURTASS LFA will provide an active adjunct capability for IUSS passive and tactical sensors to assist in countering the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters.

(U) In order to continue with reductions in life cycle costs and continue with system-wide consolidation, a long-

term goal is to develop a single IUSS processor. The IUSS processor will have the capability to process and display data from future underwater systems (such as the Advanced Deployable System (ADS) and FDS-C). The IUSS processor will also have the capability to replace the legacy systems (SSIPS, SDS, and SURTASS) as they reach end of life and require upgrading.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: Budget Activity 7: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

B. (U) PROGRAM CHANGE SUMMARY:

Project X0766 Funding: FY98 decreased by $171K for FY98 SBIR tax reduction. FY99-00 decreased 1.5% for non pay inflation

Project X0766 Schedule/Technical: FY98, delay in completing C4ISR analysis; FY99,delay start of CLFA development.

Project X0758 Funding: FY98 decreased by $17K for FY98 SBIR tax reduction. FY00 increased $1200K for common processor.

Project X0758 Schedule/Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY:

X0766:	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0766 RELATED RDT&E:
(U) PE 0204311N(Integrated Surveillance System)

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

X0758:	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

X0758 RELATED RDT&E:

(U) PE 0204311N(Integrated Surveillance System)
(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY: See individual projects for acquisition strategy.

E. (U) SCHEDULE PROFILE: See individual projects for schedule profiles.

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0766 IUSS Detect/Classif System										
TOTAL	8,025	15,483	11,997	12,014	22,041	21,344	18,845	13,828	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: LFA will provide an active adjunct capability for IUSS passive and tactical sensors to counter the quieter diesel and nuclear threats of the 1990s and beyond. The LFA tasks are directed at detection of slow quiet threats in harsh littoral waters. Functional improvements are delivered to the Fleet in software "Builds". SURTASS/LFA Build #1 (FY 97) included waveform-processing improvements, tactical processing interfaces, and signal processing enhancements. Build #2 (FY 98) includes Twin-Line/LFA integration; advanced waveforms for littoral/shallow water operations including doppler sensitive waveforms; and processing algorithms to reduce clutter and reverberation false alarms in shallow water. Also includes Adaptive Beamforming; Integration of tactical decision aids for LFA monostatic and bistatic operation; integration of SURTASS active and passive information processing systems to provide contact association and geographic tracking; and common antisubmarine warfare (ASW) OMI and environmental processing. The LFA task includes development and test of a compact LFA transmit source array for SWATH-P ships.

B. (U) PD18 is involved with the development and maintenance of various IUSS systems. These systems include FDS, FDS-C, SDS, SURTASS, and ADS. The near term objective is to obtain a common Operator Machine Interface (OMI) among currently fielded systems. The long-term goal is to develop a single IUSS processor baseline, with minor maintenance efforts continuing on fielded systems. The existing system architecture, signal processing, contact management, and reporting requirements will be evaluated as well as the requirements for future systems. The development of the IUSS processor will take advantage of automation advancement, array technology improvements, and submarine and surface system commonality.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) ($ 1,886) Transitioned SDS communications to incorporate use of Fleet standard communications equipment using NAVMACs and JMCIS. Incorporated Fleet required performance enhancements.

- (U) ($ 1,100) Investigated and corrected Year 2000 data roll over problems within SSIPS/SDS and SURTASS.

- (U) ($ 1,100) Conducted trade-off studies and analysis for CLFA source array and processing, designs and ship modification and handling system designs.

- (U) ($ 2,405) Conducted investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS. Conducted three Scientific Research Program (SRP) at-sea tests to determine impact of LFA sonar on Marine Mammals.

- (U) ($ 1,534) Initiated update of IUSS to comply with revised Naval Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Conduct associated IUSS C4ISR operating system, technical, and information architecture studied and analysis.

2. (U) FY 1999 PLANS:

- (U) ($ 5,054) Initiate development of a common IUSS processing architecture; to include signal, data, and display processing requirements generation, analysis, and contractual planning. Initiate incorporation of ARCI Advanced Processing Builds (APB)-1 architecture to support IUSS processing requirements.

- (U) ($ 2,500) Continue investigations and analysis to support preparation of Environmental Impact Statement (EIS) for SURTASS.

- (U) ($ 3,500) Continue LFA development and integration of signal/data processing software for littoral/shallow water operations and T-AGOS 23 initial at-sea testing and preparation for Pre-DT testing.

- (U) ($ 1,029) Upgrade SURTASS communications capabilities to comply with Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) guidance. Develop capability for increased data transmissions to shore.

- (U) ($ 2,500) Prototype, define, and incorporate a common Operator Machine Interface (OMI) for SURTASS and SSIPS/SDS legacy systems.

- (U) ($ 900) Conduct Sea Test Planning for T-AGOS 23 DT/OT testing.

3. (U) FY 2000 Plans:

- (U) ($ 4,100) Continue design and development of software to transition IUSS to a common processing architecture.

- (U) ($ 1,500) Continue scientific research program to support operational deployment of LFA.

- (U) ($ 1,600) Conduct DT/OT testing of T-AGOS 23 SURTASS/LFA system.

- (U) ($ 2,600) Continue LFA development and integration in support of DT/OT testing of T-AGOS 23 SURTASS/LFA system. Correct software issues identified during conduct of DT/OT testing.

- (U) ($ 1,771) Complete transition of SURTASS and SSIPS/SDS to a common OMI. Complete Factory Acceptance Testing (FAT) at each developer facility and install into fielded legacy systems. Prototype requested fleet enhancements to common OMI baseline.

- (U) ($ 426) Continue integration of IUSS into the Fleet C4ISR architecture.

B. (U) PROGRAM CHANGE EXPLANATION:

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0766
PROGRAM ELEMENT TITLE: Integrated Surveillance System PROJECT TITLE: IUSS

(U) Funding: FY98 decreased by $171K for FY98 SBIR tax reduction. FY99-00 funding decreased 1.5% for non pay inflation.

(U) Schedule/Technical: In FY98, there was a delay in completing C4ISR analysis.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN# 2225	2,328	0	0	0	0	0	0	28,046	CONT.	CONT.
OMN 1C3C	27,191	29,010	28,748	30,327	30,160	31,498	33,505	40,406	CONT.	CONT.
OPN# 2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:
- (U) PE 0204311N(Integrated Surveillance System)
- (U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
- (U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones			

BUDGET ACTIVITY: 7

PROGRAM ELEMENT: 0204311N
PROGRAM ELEMENT TITLE: Integrated Surveillance System

PROJECT NUMBER: X0766
PROJECT TITLE: IUSS

Engineering Milestones	*Build #2 LITTORAL* IMPROV 9/98	
T&E Milestones	SDS OPEVAL 1Q/99	T-AGOS 23 DLVRY 10/99 SEA TESTS;
Contract Milestones		DT-6/00,OT-8/00

Exhibit R-3 Cost Analysis (page 1)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0766
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
IUSS Common Architecture	CPFF	RSC/LM	14948	4000	12/98	2415	1/00			Cont.		9,119
Environmental Research	WR	ONR	2000	2000	10/98	1500	12/99			Cont.		4,800
LFA Improvements	CPFF	RSC/LS	73238	5000	10/98	4113	12/99			Cont.		13,413
C4I Integration	CPFF	MISC	29395	1841	1/99	1100	1/00			Cont.		4,041
Various	WX	MISC	27395	1492	10/98	1056	10/99			Cont.		3,837
Subtotal Product Development			146976	14333		10184						35,210
Remarks: RSC= Raytheon Systems Co. Fullerton, CA LM= Lockheed Martin, Manassas, VA TRW=TRW Systems Div., San Diego, CA L/S= Lockheed Sanders, Nashua, NH												
IUSS Common Arch.	WX	Various	840	150	11/98	160	11/99			Cont.		480
LFA Improvements	CPFF	TRW	2099	325	12/98	395	12/99			Cont.		1115
C4ISR Integration	CPFF	TRW	1259	100	12/98	168	12/99			Cont.		429
Subtotal Support			4198	575		723						2,024

Remarks

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758
PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

Exhibit R-3 Cost Analysis (page 2)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0766
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
IUSS Common Architecture	Var/WX	MISC.	651	0	Var.	0	Var.			Cont.		245
LFA Improvement	Var/WX	MISC.	1520	475	Var.	990	Var.			Cont.		1,715
Subtotal T&E			2171	475		990				Cont.		1,960
Remarks												
LFA Improvements/C4ISR	Var/WX	MISC.	1050	100	Var.	100	Var.			Cont.		300
Subtotal Management			1050	100		100				Cont.		300
Remarks												
Total Cost			154395	15,483		11,997						39,494
Remarks												

(Exhibit R-3, page 2 of 2)

EXHIBIT R-2a, FY2000 RDT&E BUDGET PROJECT JUSTIFICATION SHEET DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758

PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

PROJECT NUMBER & TITLE	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0758 SURTASS	1,231	3,889	6,028	6,400	5,788	6,881	7,781	7,947	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SURTASS project comprises the mobile, tactical arm of the Integrated Undersea Surveillance System, providing long range detection and cueing for tactical weapons platforms against both diesel and nuclear powered submarines. With the SOSUS Arrays being placed in a standby status (data available but not continuously monitored), SURTASS must provide the undersea surveillance necessary to support regional conflicts and sea-lane protection. SURTASS has experienced recent passive and active success against diesel submarines operating in shallow water. SURTASS is greatly reducing costs by consolidating logistics support, using Non-Developmental Items and commercial hardware, and increasing operator efficiency through computer aided detection and classification processing. SURTASS development efforts include: twin-line array processing, improved detection and classification/passive automation to counter quieter threats; additional signal processing and bi-static active capability; integrated active and passive operations; improved Battle Group support; and improved information processing. Functional improvements are delivered to the Fleet in software "Builds". Build #1 (FY 95) included source-set formulation and analysis tools, automated line trackers and nuclear source auto-detector. Build #2 (FY 96) included wideband energy trackers, wideband/narrowband feature association, and diesel Full Spectrum Processing (FSP). Build #3 (FY 97) includes automated localization and tracking, diesel automated detectors. Build #4 (FY 98) includes twin-line integration, automated classification aids that provide surface/subsurface target discrimination and subsurface target classification clues. Build #5(FY 99) includes bi-static LFA signal processing and integration of active and passive information processing subsystems to improve contact association and geographic tracking performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

(U) ($ 1,231) Continued signal processing improvements.

2. (U) FY 1999 PLANS:

- (U) ($ 1,700) Continue software development for computer aided detection and classification including improvements to nuclear and diesel auto-detectors, integration of active and passive information processing, improved classification aids and Bi-static processing.
- (U) ($ 800) Continue array improvements and integration and expanded array interoperability
- (U) ($ 1,389) Software development to support increased data processing on shore to support tactical operations.

3. (U) FY 2000 PLANS:

- (U) ($ 1,010) Develop processing improvements to support transition to TB-29 common towed array and expand array interoperability.
- (U) ($ 1,715) Complete software development to support increased data processing on shore to support tactical operations.
- (U) ($ 1,100) Continue computer aided detection, classification and tracking to improve passive performance to support tactical operations in high clutter environments.
- (U) ($ 1,003) Continue software development to improve Bi-Static operations in littoral/shallow water regions.
- (U) ($ 1,200) Develop software to transition to Common Processor.

B. (U) PROGRAM CHANGE SUMMARY: The FY1999 President’s Budget for FY 1998 was $1,265K with a subsequent reduction of $-17K for SBIR. FY00 increased $1,200K for software development to transition to Common Processor.

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: X0758
PROGRAM ELEMENT TITLE: INTEGRATED SURVEILLANCE SYSTEM

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #2237	4,571	12,659	7,267	5,594	17,456	9,464	19,721	24,656	CONT.	CONT.

(U) RELATED RDT&E:

(U) PE 0204311N(Integrated Surveillance System)
(U) PE 0603785N(Combat Systems Oceanographic Performance Assessment)
(U) PE 0603747N(Undersea Warfare Advanced Technology)

D. (U) ACQUISITION STRATEGY:

	FY 1998	FY 1999	FY 2000
Program Milestones			
		BUILD #4	BUILD #5
Engineering Milestones		COMPUTER AIDED DET/CLASS	INTEGRATED PASSIVE IP
T&E Milestones			SEA TEST INTEGRATED TWIN-LINE
Contract Milestones			

EXHIBIT R-3, FY2000 RDT&E COST ANALYSIS DATE: FEB 1999

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0204311N PROJECT NUMBER: x0758

Exhibit R-3 Cost Analysis (page 1)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0758
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Passive Auto	CPFF	RSC/APL	21735	250	12/98	1120	12/99			Cont.		3,015
Array Improvements	CPFF/WR	RSC/APL/SSC	14696	750	3/99	800	3/00			Cont.		2,600
Processing Improvements	CPFF	RSC/APL	21531	1250	1/99	2203	1/00			Cont.		4,853
Various	Var/WX	MISC.	14490	589	10/98	650	10/99			Cont		2,289
Subtotal Product Development			72452	2,839		4,773						12,757
Remarks: APL=APL/JHU RSC= Raytheon Systems Co. SSC= SPAWAR Systems Center.												
Passive/Array improvements	Var/WX	MISC	1627	150	10/98	250	10/99			Cont.		650
Subtotal Support			1627	150		250						650
Remarks												

Exhibit R-3 Cost Analysis (page 2)												Date: Jan 1999
RDT&E/Budget Activity 7			PROGRAM ELEMENT: 0204311N									SURTASS x0758
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date			Cost To Complete	Total Cost	Target Value of Contract
Passive/Array improvements	Var/WX	MISC.	2126	800	10/98	905	10/99			Cont.		2,610
Subtotal T&E			2126	800		905						2,610
Remarks												
Passive/Array improvements	Var/WX	MISC.	407	100	10/98	100	10/99			Cont.		300
Subtotal Management			407	100		100						300
Remarks												
Total Cost			76612	3,889		6,028						16,317
Remarks												

R-1 Shopping List - Item No 1 of 1

(Exhibit R-3, page 2 of 2)