

Robert Stobie Spectrograph – Near Infrared (RSS-NIR) Project Funding, Spending, and Budget Detail



Mid-Term Review
May 2009



Table of Contents

PROJECT BUDGET, SPENDING, AND FUNDING.....	4
BUDGET CHANGES FROM CoDR TO PDR.....	6
BUDGET CHANGES FROM PDR TO MTR.....	7
BUDGET DETAIL	7
LABOR AND BUDGET SUMMARY.....	8
PROJECT YEAR PROFILE	9
MATERIAL DETAIL	10
CAPITAL EQUIPMENT DETAIL.....	12
TRAVEL DETAIL.....	13
BUDGET SUMMARY BY WBS SUBSYSTEM.....	15
WBS DETAIL BUDGET SUMMARIES	16

PROJECT BUDGET, SPENDING, AND FUNDING

Budget. The estimated cost of the RSS-NIR is \$5,811,047. This includes \$446,216 spent through March plus an estimate to complete of \$5,364,831. The budget, without contingency, is summarized in **Table 1**.

Table 1. *RSS-NIR Budget without contingency.*

Spending to date (3/31/09)	\$446,216
Budget Estimate (04/09-03/12)	\$5,364,831
INSTRUMENT COST	\$5,811,047

The budget does not include the purchase of the Fabry-Perot etalon and controller. In April, a ROM estimate was received from ICOS for an etalon with water free silica (Infrasil 302) glass and a controller in the amount of \$271,920. A request has been submitted to the NSF for a 10% increase in their funding support through the MRI program. The project hopes to have an answer by July 2009. An informal agreement has been made with Ted Williams at Rutgers University to fund the purchase of the controller. Combined, this will provide for the purchase. The Rutgers funding is contingent upon receiving the NSF funding. The purchase of the etalon brings the total cost of the RSS-NIR is \$6,082,967 without contingency.

Table 2. *RSS-NIR Total Cost with Fabry-Perot*

Total Instrument Cost	\$5,811,047
Fabry-Perot w/ controller ROM	\$271,920
INSTRUMENT W/ ETALON	\$6,082,967

The formal start to the project was in July 2008. Its duration is 45 months, including 4 months of schedule reserve, and ends March 2012. Project years run July 1 to June 30. We are in the 4th quarter of Project Year 1. Financial status and progress reports are submitted quarterly David Buckley, SALT Project Scientist.

The budget was developed per the Work Breakdown System described in section 6.6. Each WBS elements represents a subsystem with a deliverable. The exceptions are project administration; integration, verification, and testing; and commissioning, which represent project management and phases of the project.

Spending. Through March 2009, \$446,216 has been spent on the project leaving a balance of \$5,364,831. The Department of Astronomy/Space Astronomy Lab tracked project spending prior to July 1, 2008. Spending through then was \$59,773. Since then, the Space Science and Engineering Center has been responsible for the project accounting. **Table 3** summarizes the spending and balance remaining.

Table 3. *RSS-NIR Spending Summary*

Funding	\$5,811,047
Spending prior to 7/1/08	\$59,733
Spending post to 6/30/08	\$386,483
BALANCE	\$5,364,831

Table 4 provides a monthly breakdown of spending since July by cost category.

Table 4. RSS-NIR Monthly Spending Since July 2008

RSS-NIR SUMMARY	PROJECT YEAR 1									PROJECT TOTAL
	2008						2009			
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Monthly Spending										
LABOR	\$5,604	\$12,037	\$7,808	\$35,427	\$20,938	\$21,268	\$35,354	\$40,747	\$58,251	\$237,433
MATERIAL	\$0	\$0	\$4,244	\$5,926	\$0	\$965	\$5,005	\$862	\$4,524	\$21,525
CAPITAL EQUIPMENT	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,250	\$6,250
TRAVEL	\$0	\$1,006	\$647	\$4,871	(\$596)	\$324	\$0	\$2,781	\$643	\$9,675
SUBCONTRACTS	\$0	\$54,146	\$4,980	\$4,610	\$13,211	\$4,981	\$7,237	\$4,461	\$4,818	\$98,443
TUITION REMISSION	\$0	\$0	\$889	\$889	\$889	\$889	\$889	\$889	\$889	\$6,222
OVERHEAD	\$0	\$0	\$0	\$0	\$169	\$482	\$2,109	\$2,103	\$2,071	\$6,934
Monthly Total	\$5,604	\$67,188	\$18,568	\$51,722	\$34,610	\$28,908	\$50,594	\$51,843	\$77,445	\$386,483
Running Total	\$5,604	\$72,792	\$91,360	\$143,082	\$177,692	\$206,600	\$257,195	\$309,038	\$386,483	

The spending reflects the ramp up of resources to the project. SSEC staff did not start charging the project until the WARF and NSF funds were formally in place by October 1 as seen by the jump in spending from September to October. The August spike was due to invoices from Paradigm Designs and Bit7 engineering services for their support of the July PDR.

The \$6,250 capital equipment purchase is the initial payment on the bare mux. The \$192,000 initial payment on the science and engineering grade detectors and electronics has not processed through the accounting system yet.

Contingency. At PDR, the project budget included an 11.5% contingency. The review panel recommended the project increase this to 15-20%. The project is currently applying a 15.2% contingency for the budget estimate to complete the instrument without the etalon, which equals \$710,728. Please note, the cost of the detector (\$520,000) and the camera and doublet optic blanks (formal bids received, \$155,495) are not included in the percent contingency calculations since their costs are known. With contingency, the total instrument cost is \$6,521,775. If the etalon is included, the total increases to \$6,793,695. These figures are summarized in Table 5.

Table 5. RSS-NIR Budget with contingency. Please note, the cost of the detector (\$520,000) and the camera and doublet optic blanks (formal bids received, \$155,495) are not included in the percent contingency calculations since their costs are known.

Spending to date (3/31/09)	\$446,216
Budget Estimate (04/09-03/12)	\$5,364,831
INSTRUMENT COST	\$5,811,047
Contingency 15.2%	\$710,728
TOTAL INSTRUMENT COST	\$6,521,775

Instrument cost w/contingency	\$6,521,775
Fabry-Perot w/ controller ROM	\$271,920
INSTRUMENT W/ ETALON	\$6,793,695

Funding. The RSS-NIR has received \$3.3M from the Wisconsin Alumni Research Foundation and just under \$2.0M from the National Science Foundation. The SALT consortium has provided \$145k and is committed to providing an additional \$155k. Another \$925k was formally requested at a SSWG in 2008. The total RSS-NIR funding is just over \$6.5M as shown in Table 6.

Table 6. RSS-NIR Funding Summary

WARF		\$3,300,000
NSF		\$1,996,775
SALT		
Initial Rec'd	\$145,000	
Committed	\$155,000	
Requested	\$925,000	
		\$1,225,000
TOTAL FUNDING		\$6,521,775

The support provides enough funding to cover the instrument cost with a 15.2% contingency without the etalon.

BUDGET CHANGES FROM CoDR TO PDR

The budget has grown since CoDR. The budget presented at CoDR was not developed from a grass roots level and there have been significant increases in scope. Primarily these scope increases have occurred from the original plan, which was to duplicate the design philosophy and detailed design of the systems and sub-systems produced by the RSS-VIS. After the decision was made to cool the RSS-NIR beam, it was determined that we were developing an entirely new instrument which would need many new systems and sub-systems designed and detailed from scratch. For example, the following design changes occurred between CoDR and PDR

- Spectral range increased from 0.9 – 1.4 to 0.9 – 1.7 microns, although the possibility to extend to 1.9 at low resolution for bright objects through warm-optics noise was considered.
- A fixed vs. articulating camera
- The CoDR scope did not include a Fabry-Perot etalon or its mechanism. The design would leave space for one. The PDR budget included the entire etalon and mechanism.
- No cooling.
- Commissioning was added at PDR.

The increases in scope are reflective of the budget increase.

CoDR	\$2,595,437
PDR	<u>\$6,196,773</u>
	$\Delta = \$3,601,336$

In part, the detailed, bottoms up budget development led to some of the cost increase, but much of the cost increase can be attributed to the scope increase as follows:

• Added commissioning	\$475,000
• Integration, Verification, and Testing	\$469,699
• Predewar Enclosure & cooling	\$299,065
• Detector & Dewar estimate increase	\$201,485
• Fabry-Perot etalon	\$295,655
• Contingency (CoDR had \$0)	\$631,900
• Indirect (due to increased costs)	\$389,011

The rest of difference (~\$800k) is composed of labor. These were driven by the need to redesign the RSS-NIR as opposed to building duplicate systems to the RSS-VIS. Labor increases are summarized below.

- Engineering, design, and technical support increased from 7 man-months to 137.
- Machinist increased to 18 man-months. The CoDR budget assumed that only the department machinist would be used.
- Project management, quality assurance, safety, and systems engineering increased from 7 to 45 man-months.

BUDGET CHANGES FROM PDR TO MTR

The following table summarizes the budget differences from PDR to MTR and lists changes in scope or budget development to provide a like comparison.

Table 7. PDR to MTR Budget Comparison

Scope change or reason for difference	PDR	MTR
1. Budget with contingency	\$6,196,773	\$6,521,775
2. Add in Fabry-Perot to MTR budget		\$271,920
3. Increases in scope from PDR - MTR <ul style="list-style-type: none"> • Tip/tilt of fold mirror • Environment control of RSS optics 		-\$54,947 -\$80,373
4. Add pre-July 1 spending to PDR budget (this was not included in the PDR budget presentation).	\$59,733	
5. Increased contingency to over 15% on MTR		-\$78,828
6. Increased the number (7 to 12) and updated the cost estimate for the Fabry-Perot order blocking filters		-\$204,000
7. Increased Project Administration budget <ul style="list-style-type: none"> • Increased science team member support by 6 months. • Added a semester of instructor buyout • Increased PM from 1/3 to 1/2 time • Increased SE from 1/5 to 2/5 time • Added software licensing fees and review costs 		-\$176,097
8. Increased labor support of IV&T		-\$80,817
9. Decreased cost of dewar development <ul style="list-style-type: none"> • Dewar development is now being done in-house with the support of Stephen Smee. The cost savings is reflected against the GL Scientific ROM used in the PDR budget. 		\$89,595
Adjusted Budgets	\$6,256,506	\$6,208,228

With the adjustments, the budgets are within three-quarters of a percent.

BUDGET DETAIL

The following pages provide detail on the remaining \$6.1M budget. An overall summary is provided along with detailed material and capital equipment lists, travel, and subsystem budgets.

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

BUDGET SUMMARY

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
Principal Investigator, Andrew Sheinis	150	300	300	150	900	0.19
Project Scientist, Marsha Wolf	450	1,800	1,800	750	4,800	1.00
Co-Investigator, Matt Bershady	150	150	150	0	450	0.09
Co-Investigator, Amy Barger	0	0	150	0	150	0.03
Sr. Scientist Advisor, Ken Nordsieck	75	75	75	0	225	0.05
Project Manager, Mark Mulligan	255	1,020	1,020	250	2,545	0.53
Quality Assurance & Safety Manager, Tom Demk	75	300	300	25	700	0.15
Systems Engineer, Don Thielman	225	900	900	450	2,475	0.52
Electrical Engineer, Paul Sendelbach	60	440	200	0	700	0.15
Lead Mechanical Engineer, Mike Smith	450	1,800	1,800	450	4,500	0.94
Electronics Technician	0	725	1,280	0	2,005	0.42
Opto-mechanical Engineer, Jeff Wong*	225	900	655	0	1,780	0.37
Software Programmer, Jeff Percival	225	900	1,145	375	2,645	0.55
Postdoc, Ryan Doering	450	1,800	1,800	225	4,275	0.89
Mechanical Engineer, Bill Mason	435	1,740	1,250	450	3,875	0.81
Designers*	105	2,245	225	0	2,575	0.54
Machinist	0	2,175	1,325	0	3,500	0.73
Instructor	0	600	600	600	1,800	0.38
Co-Investigator, Ted Williams	75	75	75	0	225	0.05
Controls Engineer, Ron Koch*	225	900	725	0	1,850	0.39
Graduate Students	225	1,650	1,800	750	4,425	0.92
Undergraduate Students	360	2,090	1,330	250	4,030	0.84

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	4,215	22,585	18,905	4,725	50,430	10.51
TOTAL FTEs:	9.37	50.19	42.01	10.50	10.51	

SALARY	\$164,574	\$719,547	\$686,818	\$204,082	\$1,775,021
FRINGE	\$57,464	\$252,198	\$247,698	\$74,811	\$632,171
TOTAL LABOR	\$222,038	\$971,745	\$934,516	\$278,893	\$2,407,192

MATERIAL	\$40,740	\$187,020	\$58,100	\$19,000	\$304,860
-----------------	----------	-----------	----------	----------	-----------

CAPITAL EQUIPMENT	\$244,974	\$884,330	\$296,550	\$10,000	\$1,435,854
--------------------------	-----------	-----------	-----------	----------	-------------

TRAVEL	\$18,621	\$21,729	\$4,439	\$95,303	\$140,092
---------------	----------	----------	---------	----------	-----------

SUBCONTRACTS / SERVICES	\$57,043	\$395,408	\$157,693	\$8,900	\$619,043
--------------------------------	----------	-----------	-----------	---------	-----------

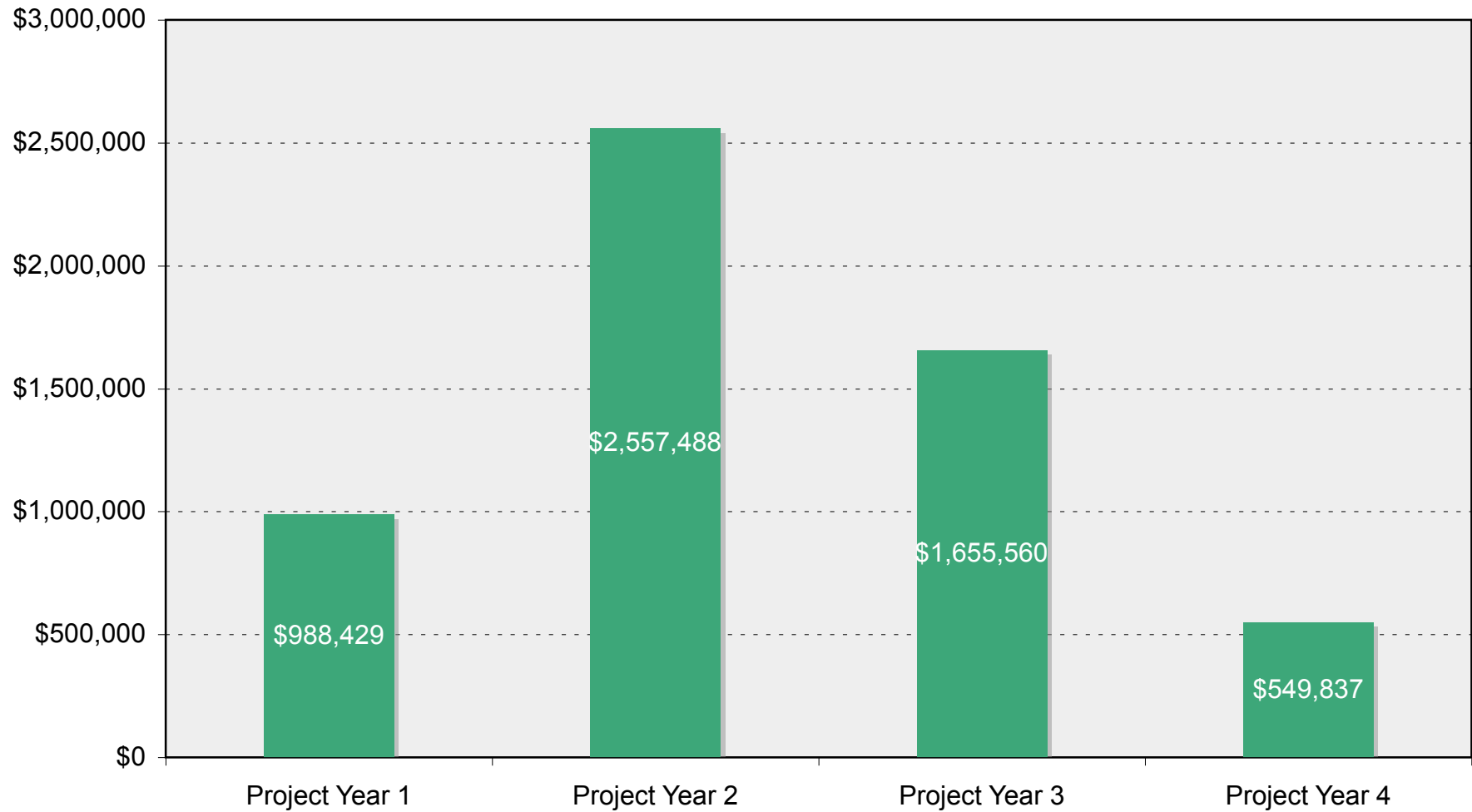
TOTAL DIRECT	\$591,956	\$2,491,248	\$1,456,638	\$412,096	\$4,951,938
TOTAL INDIRECT	\$9,990	\$66,240	\$198,922	\$137,741	\$412,893
TOTAL	\$601,946	\$2,557,488	\$1,655,560	\$549,837	\$5,364,831

**CONTINGENCY:	15.2%	\$710,728
-----------------------	-------	-----------

TOTAL INSTRUMENT COST WITH CONTINGENCY:	\$6,075,559
------------------------------------------------	-------------

**DOES NOT INCLUDE THE DETECTOR (ORDER PLACED) NOR CAMERA AND DOUBLET BLANKS (BIDS RECEIVED) IN THE PERCENT CONTINGENCY

RSS NIR Budget Profile Mid-Term Review May 2009



NEAR INFRARED SPECTROGRAPGH FOR SALT
MATERIAL SUMMARY LIST

1.0 PROJECT ADMINISTRATION

Publications (SPIE,...)	\$ 4,000
Conference Fees (4 attendees @ \$1250/ea)	\$ 10,000
Computer (desktop or laptop)	\$ 9,000
Solidworks Lic (AIS), PDM (TAD)	\$ 3,350
Solidworks PDM Enterprise Training	\$ 8,000
Miscellaneous	\$ 6,400
MTR	\$ 7,500
CDR	\$ 7,500
	<u>\$ 55,750</u>

2.0 OPTICAL ELEMENTS

2.1 Optical Design

SolidWorks Maintenance (MJW)	\$ 750
Computer (PS)	\$ 3,000
Software (PS)	\$ 1,000
Computer (Grad)	\$ 6,000
Software (Grad)	\$ 2,000
	<u>\$ 12,750</u>

2.2 Dichrioc

Lens holder	\$ 750
Material	\$ 250
Miscellaneous	\$ 500
SolidWorks Annual Fee (WPM)	\$ 1,000
SolidWorks PDM (WPM)	\$ 2,800
	\$ -
	\$ -
	<u>\$ 5,300</u>

2.3 Doublet

Lens holder	\$ 750
Material	\$ 250
Miscellaneous	\$ 1,000
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	<u>\$ 2,000</u>

2.4 Fold Mirror

Lens holder	\$ 750
Material	\$ 250
Miscellaneous	\$ 1,000
	\$ -
	\$ -
	\$ -
	\$ -
	<u>\$ 2,000</u>

2.5 Fold Mirror Mechanism

Linear Encoder (1)	\$ 1,000
Limit Sensors (11)	\$ 500
Material	\$ 150
Misc	\$ 300
	\$ -
	<u>\$ 1,950</u>

3.0 GRATING ASSEMBLY

Material	\$ 500
Holder	\$ 500
Bearings	\$ 500
Drive Screw	\$ 500
Drive Gear, coupling, or other device	\$ 300
Hall Sensors (6)	\$ 120
Miscellaneous	\$ 500
	<u>\$ 2,920</u>

4.0 FILTER & OPTICS STORAGE ASSEMBLY

Material	\$ 750
Storage optics drive screw	\$ 250
Storage optics bearing blocks	\$ 750
Filter insertion drive screw	\$ 250
Filter insertion bearings	\$ 250
Miscellaneous hardware	\$ 1,500
SolidWorks PDM (JPW)	\$ 2,800
Hall Sensor (60)	\$ 900
	<u>\$ 7,450</u>

NEAR INFRARED SPECTROGRAPGH FOR SALT**MATERIAL SUMMARY LIST****5.0 FABRY-PEROT ETALON**

Material	\$ 750
Bearings & precision guides	\$ 1,000
Drive shaft	\$ 500
Miscellaneous	\$ 1,000
Hall Sensors (6)	\$ 90
Pneumatic Lock (3)	\$ 900
	\$ -
	\$ 4,240

6.0 POLARIZING BEAM SPLITTER

Material	\$ 750
Frame	\$ 500
Insertion mechanism, pneumatic (2)	\$ 1,000
Hall Sensors (3)	\$ 45
Miscellaneous	\$ 1,250
Guide rails and bearings	\$ 1,200
	\$ 4,745

7.0 CAMERA SUBASSEMBLY

Material & Misc H/W	\$ 3,000
Gearbox, drive gear, precision bearings/rollers	\$ 4,000
Pneumatic Lock, Articulation	\$ 500
Camera Focus Linear Encoder (2)	\$ 1,500
Limit Switches (5)	\$ 375
Hall Sensors (6)	\$ 90
Articulation Actuator (2) [Dynatec Sys BL2330]	\$ 2,200
Articulation Position Encoder, Absolute (2)	\$ 2,500
Solidworks & S/W PDM (WPS)	\$ 3,800
	\$ 17,965

8.0 DETECTOR / DEWAR ASSEMBLY

CPU Workstation	\$ 3,000
Software and IDL licensing	\$ 2,000
Material	\$ 1,000
Filter wheel actuator [Phytron]	\$ 1,500
Filter wheel encoder, absolute	\$ 1,250
Cryocooler Compressor & Fittings	\$ 11,500
Hall Sensors & Misc	\$ 3,810
Temperature sensors & controller	\$ 8,000
Cabling	\$ 4,500
	\$ 36,560

9.0 PREDEWAR SUBASSEMBLY

Materials - thermal insulating	\$ 3,000
Materials - structural	\$ 1,000
Enclosure thermal control (heaters, controller, wiring...)	\$ 3,000
Baffling coatings - paint	\$ 1,000
Pneumatics (3) & Misc. H/W	\$ 6,500
Thermocouples & Hall Sensors (6)	\$ 1,090
SolidWorks Licenses - Renewals (DPA/ARR)	\$ 1,290
PDM Licenses - Renewals (ARR)	\$ 2,800
CAD CPU & Monitor	\$ 6,000
	\$ 25,680

11.0 CONTROL SYSTEM

Enclosure material	\$ 500
Additional sensors	\$ 1,200
Cabling	\$ 6,000
Labview Software Licensing	\$ 2,400
PC Boards	\$ 7,500
Miscellaneous	\$ 14,000
Computer Hardware	\$ 6,000
	\$ 37,600

12.0 POWER DISTRIBUTION

Power Supplies	\$ 7,500
PC Boards	\$ 7,500
Cabling	\$ 5,000
Material	\$ 500
Heat sinks	\$ 500
Miscellaneous Hardware	\$ 8,000
	\$ 29,000

13.0 SUPPORT AND TEST EQUIPMENT

Material	\$ 5,000
Testing Computer support hardware	\$ 5,000
Software and licensing	\$ 3,000
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ 13,000

14.0 INTEGRATION, VERIFICATION, AND TESTING

Miscellaneous Expenses	\$ 10,000
Labview Software License	\$ 1,200
SolidWorks Licenses - Renewals	\$ 4,500
PDM Licenses - Renewals	\$ 2,000
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ 17,700

15.0 COMMISSIONING

Miscellaneous equipment / expenses	\$ 10,500
Shipping container and packing materials	\$ 2,500
SolidWorks Licenses - Renewals	\$ 4,500
PDM Licenses - Renewals	\$ -
LabView Renewal	\$ 500
	\$ -
	\$ -
	\$ -
	\$ -
	\$ -
	\$ 18,000

NEAR INFRARED SPECTROGRAPGH FOR SALT

CAPITAL EQUIPMENT SUIMMARY LIST

1.0 PROJECT ADMINISTRATION	\$ -	6.0 POLARIZING BEAM SPLITTER	\$ 55,000
	\$ -	Polarizing beam splitter	\$ 55,000
	\$ -	Coating	\$ 5,000
	\$ -		\$ 60,000
2.0 OPTICAL ELEMENTS		7.0 CAMERA SUBASSEMBLY	
2.1 Optical Design	\$ -	Optical blanks & Witness Samples(7)	\$ 127,567
	\$ -	Lens fabrication	\$ 77,000
	\$ -	Lens coating	\$ 28,000
	\$ -	Camera Focus Actuator (1) [Physic M-235]	\$ 3,373
	\$ -		\$ 235,940
2.2 Dichrioc		8.0 DETECTOR / DEWAR ASSEMBLY	
Mirror blank	\$ 10,000	SG H2RG FPA	\$ 350,000
Mirror figuring	\$ 10,000	EG H2RG FPA	\$ 50,000
Mirror coating	\$ 15,000	Sidecar - Bare Mux, Cryo & Room Temp	\$ 67,000
	\$ -	Bare Mux	\$ 25,000
	\$ -	Filters	\$ 20,000
	\$ 35,000		\$ 512,000
2.3 Doublet		9.0 PREDEWAR SUBASSEMBLY	
Optic Blank	\$ 27,928	Baffling coating - plating	\$ 5,000
Lens grinding, surfacing, and figuring	\$ 22,000	Chiller - FTS ULT Series RC210	\$ 32,000
Coating	\$ 8,000	Chilller plumbing	\$ 7,500
	\$ 57,928		\$ 44,500
2.4 Fold Mirror		11.0 CONTROL SYSTEM	
Purchase Lens	\$ 7,500	Motor Controller & Motion Control Boards	\$ 19,500
	\$ -	DAQ and I/O hardware	\$ 7,500
	\$ 7,500		\$ 27,000
2.5 Fold Mirror Mechanism		12.0 POWER DISTRIBUTION	
Tip/Tilt Stage+Piston Piezo [Physik P-541.Z & P-290.(\$ 11,743		\$ -
Controller, Power Supply [Physik E-500.0]	\$ 2,490		\$ -
Servo Modules [Physik E-509.S3 & E-509.C1A]	\$ 6,865		\$ -
Amplifie Modules [Physik E-503.0 & E-508.0]	\$ 4,772		\$ -
I/F Modules [Physik E516.i1 & E-516.i3]	\$ 7,135		\$ -
	\$ 33,005		\$ -
3.0 GRATING ASSEMBLY		13.0 SUPPORT AND TEST EQUIPMENT	
Grating Insertion Actuator (1) [Ultramotion HT17]	\$ 750	Test setup optics & lamps	\$ 10,000
Grating Absolute Encoder (1)	\$ 1,075	Throughput test equipment	\$ 10,000
Grating Rotation Stage Actuator (2) [Physik M-037.DC	\$ 8,356	Other test equipment	\$ 30,000
Grating Absolute Rotary Encoder (2)	\$ 2,150		\$ -
Gratings	\$ 80,000		\$ -
	\$ 92,331		\$ 50,000
4.0 FILTER & OPTICS STORAGE ASSEMBLY		14.0 INTEGRATION, VERIFICATION, AND TESTING	
F-P Order Blocking Filters	\$ 234,000		\$ -
OSA Drive Actuator (2) [Ultramotion HT23]	\$ 1,900		\$ -
OSA Absolute Position Encoder (2)	\$ 2,150		\$ -
Filter Insertion & Lock Actuators (2) [Ultramotion HT17]	\$ 1,500		\$ -
Filter Absolute Position Encoder (1)	\$ 1,075		\$ -
	\$ 240,625		\$ -
5.0 FABRY-PEROT ETALON		15.0 COMMISSIONING	
F-P Insertion Actuator (1) [Ultramotion HT23]	\$ 950	Instrument Shipping	\$ 10,000
F-P Absolute Encoder (1)	\$ 1,075		\$ -
	\$ 2,025		\$ 10,000

NEAR INFRARED SPECTROGRAPGH FOR SALT
IN 2009 DOLLARS

Data Collected:

4/15/08

Origin	Destination								
	Atlanta	Boston	Cape Town	Denver	Los Angeles	Madison	San Francisco	Seattle	Wash DC
Atlanta									
Boston									
Cape Town									
Denver									
Los Angeles									
Madison	\$307	\$196	\$2,288	\$319	\$271		\$210	\$240	\$183
San Francisco									
Seattle									
Wash DC									

Airport Code: ATL BOS CPT DEN LAX MSN SFO SEA DCA

Hotel / Day	\$141	\$212	\$100	\$149	\$128	\$69	\$168	\$158	\$202
Automobile / Day	\$37.50	\$47.50	\$24.00	\$40.50	\$37.50	\$37.50	\$37.50	\$37.50	\$43.50
Meal Allowance	\$40	\$40	\$40	\$40	\$40	\$34	\$40	\$40	\$40

NOTES:

- [1] Weighted average of seasonal rates.
- [3] Subcompact daily rate
- [4] City Surcharge Rate Applied to \$36 base rate
- [5] Flight costs are the average of 3-8 airline prices (high and low removed) assuming at least a two week advance purchase of a Monday to Friday trip except Cape Town. That destination assumes a two week stay and the lower two estimates of three were used for the average.
- [6] Cape Town car rental based on one week at the \$168 (average of 5 with high and low removed) or \$24/day.

NIR BUDGET SUMMARY BY WBS	PY01	PY02	PY03	PY04	
Tasks	2008-2009	2009-2010	2010-2011	2011	TOTAL
	APR - JUN	JUL - JUN	JUL - JUN	JUL - DEC	
1.0 PROJECT ADMINISTRATION	\$100,591	\$322,059	\$311,957	\$87,104	\$821,711
2.0 OPTICAL ELEMENTS	\$68,463	\$389,878	\$105,450	\$0	\$563,791
3.0 GRATING ASSEMBLY	\$3,375	\$120,225	\$12,959	\$0	\$136,559
4.0 FILTER & OPTICS STORAGE ASSEMBLY	\$6,800	\$113,396	\$178,757	\$0	\$298,953
5.0 FABRY-PEROT ETALON	\$15,801	\$50,553	\$16,032	\$0	\$82,386
6.0 POLARIZING BEAM SPLITTER	\$24,360	\$57,072	\$54,202	\$0	\$135,635
7.0 CAMERA SUBASSEMBLY	\$54,962	\$320,885	\$34,282	\$0	\$410,129
8.0 DETECTOR / DEWAR ASSEMBLY	\$236,428	\$576,046	\$76,385	\$0	\$888,859
9.0 PREDEWAR SUBASSEMBLY	\$30,709	\$166,341	\$50,569	\$0	\$247,618
10.0 RSS COMMON OPTICS ENVIRONMENTAL CONTROL	\$11,029	\$29,248	\$40,096	\$0	\$80,373
11.0 CONTROL SYSTEM	\$41,598	\$238,922	\$83,922	\$0	\$364,442
12.0 POWER DISTRIBUTION	\$7,830	\$102,005	\$44,837	\$0	\$154,672
13.0 SUPPORT AND TEST EQUIPMENT	\$0	\$70,859	\$95,595	\$0	\$166,454
14.0 INTEGRATION, VERIFICATION, AND TESTING	\$0	\$0	\$550,516	\$0	\$550,516
15.0 COMMISSIONING	\$0	\$0	\$0	\$462,733	\$462,733
TOTAL	\$601,946	\$2,557,488	\$1,655,560	\$549,837	\$5,364,831

**NEAR INFRARED SPECTROGRAPGH FOR SALT
BUDGET ESTIMATE**

1.0 PROJECT ADMINISTRATION	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	150	300	300	150	900	0.19
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	150	150	150	0	450	0.09
Co-Investigator, Amy Barger	0	0	150	0	150	0.03
Sr. Scientist Advisor, Ken Nordsieck	0	0	75	0	75	0.02
Project Manager, Mark Mulligan	255	1,020	1,020	250	2,545	0.53
Quality Assurance & Safety Manager, Tom Demke	75	300	300	25	700	0.15
Systems Engineer, Don Thielman	225	900	900	0	2,025	0.42
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	0	0	0	0	0.00
Machinist	0	0	0	0	0	0.00
Instructor	0	600	600	600	1,800	0.38
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	90	600	600	250	1,540	0.32
<i>*Labor costs for these resources are presented in Subcontracts/Services.</i>						
TOTAL HOURS:	945	3,870	4,095	1,275	10,185	2.12
TOTAL FTEs:	2.10	2.15	2.28	1.70	2.12	
SALARY	\$53,367	\$200,749	\$215,212	\$62,777	\$532,105	
FRINGE	\$20,241	\$75,260	\$79,106	\$23,327	\$197,934	
TOTAL LABOR	\$73,608	\$276,009	\$294,318	\$86,104	\$730,039	
MATERIAL						
Publications (SPIE,...)	\$0	\$2,000	\$2,000	\$0	\$4,000	
Conference Fees (4 attendees @ \$1250/ea)	\$0	\$5,000	\$5,000	\$0	\$10,000	
Computer (desktop or laptop)	\$3,000	\$3,000	\$3,000	\$0	\$9,000	
Solidworks Lic (AIS), PDM (TAD)	\$0	\$2,550	\$800	\$0	\$3,350	
Solidworks PDM Enterprise Training	\$0	\$8,000	\$0	\$0	\$8,000	
Miscellaneous	\$600	\$2,400	\$2,400	\$1,000	\$6,400	
MTR	\$7,500	\$0	\$0	\$0	\$7,500	
CDR	\$0	\$7,500	\$0	\$0	\$7,500	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$11,100	\$30,450	\$13,200	\$1,000	\$55,750	
CAPITAL EQUIPMENT						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
TRAVEL						
Conference	\$0	\$4,439	\$4,439	\$0	\$8,878	
MTR - Reviewers	\$3,745	\$0	\$0	\$0	\$3,745	
CDR - Reviewers	\$0	\$3,745	\$0	\$0	\$3,745	
Support RSS-VIS Reassembly & See Facilities	\$4,722	\$0	\$0	\$0	\$4,722	
Support RSS-VIS Reassembly & See Facilities	\$7,416	\$7,416	\$0	\$0	\$14,832	
TOTAL	\$15,883	\$15,600	\$4,439	\$0	\$35,922	
SUBCONTRACTS / SERVICES						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
Paradigm Design	\$0	\$0	\$0	\$0	\$0	
Bit7	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
TOTAL DIRECT	\$100,591	\$322,059	\$311,957	\$87,104	\$821,711	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$100,591	\$322,059	\$311,957	\$87,104	\$821,711	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.0 OPTICAL ELEMENTS

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	450	1,800	750	0	3,000	0.63
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	75	75	0	0	150	0.03
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	30	120	50	0	200	0.04
Electronics Technician	0	0	40	0	40	0.01
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	150	600	250	0	1,000	0.21
Designers*	0	480	0	0	480	0.10
Machinist	0	350	100	0	450	0.09
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	225	1,650	750	0	2,625	0.55
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	930	5,075	1,940	0	7,945	1.66
TOTAL FTEs:	2.07	2.82	1.08	0.00	1.66	
SALARY	\$36,024	\$152,609	\$62,829	\$0	\$251,462	
FRINGE	\$11,270	\$51,521	\$21,531	\$0	\$84,322	
TOTAL LABOR	\$47,294	\$204,130	\$84,360	\$0	\$335,784	
MATERIAL	\$4,250	\$15,250	\$4,500	\$0	\$24,000	
CAPITAL EQUIPMENT	\$8,378	\$113,805	\$11,250	\$0	\$133,433	
TRAVEL	\$0	\$0	\$0	\$0	\$0	
SUBCONTRACTS / SERVICES	\$0	\$25,680	\$0	\$0	\$25,680	
TOTAL DIRECT	\$68,463	\$389,878	\$105,450	\$0	\$563,791	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$68,463	\$389,878	\$105,450	\$0	\$563,791	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.1 Optical Design	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR-JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	450	1,800	750	0	3,000	0.63
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	75	75	0	0	150	0.03
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	0	0	0	0	0.00
Machinist	0	0	0	0	0	0.00
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	225	1,650	750	0	2,625	0.55
Undergraduate Students	0	0	0	0	0	0.00
<i>*Labor costs for these resources are presented in Subcontracts/Services.</i>						
TOTAL HOURS:	750	3,525	1,500	0	5,775	1.20
TOTAL FTEs:	1.67	1.96	0.83	0.00	1.20	
SALARY	\$26,748	\$107,291	\$43,845	\$0	\$177,884	
FRINGE	\$7,699	\$33,169	\$13,965	\$0	\$54,833	
TOTAL LABOR	\$34,447	\$140,460	\$57,810	\$0	\$232,717	
MATERIAL						
SolidWorks Maintenance (MJW)	\$0	\$750	\$0	\$0	\$750	
Computer (PS)	\$3,000	\$0	\$0	\$0	\$3,000	
Software (PS)	\$1,000	\$0	\$0	\$0	\$1,000	
Computer (Grad)	\$0	\$3,000	\$3,000	\$0	\$6,000	
Software (Grad)	\$0	\$1,000	\$1,000	\$0	\$2,000	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$4,000	\$4,750	\$4,000	\$0	\$12,750	
CAPITAL EQUIPMENT						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
TRAVEL						
Meet w/ Harland	\$1,761	\$0	\$0	\$0	\$1,761	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$1,761	\$0	\$0	\$0	\$1,761	
SUBCONTRACTS / SERVICES						
Tuition Remission	\$1,780	\$16,020	\$5,340	\$0	\$23,140	
Dr. Harland Epps, Optical Design	\$5,000	\$15,000	\$0	\$0	\$20,000	
Paradigm Design	\$0	\$0	\$0	\$0	\$0	
Bit7	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$6,780	\$31,020	\$5,340	\$0	\$43,140	
TOTAL DIRECT	\$46,989	\$176,231	\$67,150	\$0	\$290,370	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$46,989	\$176,231	\$67,150	\$0	\$290,370	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.2 Dichrioc	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR-JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	45	180	75	0	300	0.06
Designers*	0	120	0	0	120	0.03
Machinist	0	100	50	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00
<i>*Labor costs for these resources are presened in Subcontracts/Services.</i>						
TOTAL HOURS:	45	400	125	0	570	0.12
TOTAL FTEs:	0.10	0.22	0.07	0.00	0.12	
SALARY	\$2,395	\$11,927	\$5,163	\$0	\$19,485	
FRINGE	\$922	\$4,850	\$2,116	\$0	\$7,888	
TOTAL LABOR	\$3,317	\$16,777	\$7,279	\$0	\$27,373	
MATERIAL						
Lens holder	\$0	\$750	\$0	\$0	\$750	
Material	\$0	\$250	\$0	\$0	\$250	
Miscellaneous	\$0	\$500	\$0	\$0	\$500	
SolidWorks Annual Fee (WPM)	\$250	\$750	\$0	\$0	\$1,000	
SolidWorks PDM (WPM)	\$0	\$2,300	\$500	\$0	\$2,800	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$250	\$4,550	\$500	\$0	\$5,300	
CAPITAL EQUIPMENT						
Mirror blank	\$0	\$10,000	\$0	\$0	\$10,000	
Mirror figuring	\$0	\$10,000	\$0	\$0	\$10,000	
Mirror coating	\$0	\$3,750	\$11,250	\$0	\$15,000	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$23,750	\$11,250	\$0	\$35,000	
TRAVEL						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
SUBCONTRACTS / SERVICES						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
Paradigm Design	\$0	\$0	\$0	\$0	\$0	
Bit7	\$0	\$6,420	\$0	\$0	\$6,420	
TOTAL	\$0	\$6,420	\$0	\$0	\$6,420	
TOTAL DIRECT	\$3,565	\$51,488	\$19,029	\$0	\$74,082	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$3,565	\$51,488	\$19,029	\$0	\$74,082	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.3 Doublet

LABOR	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR-JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	60	240	100	0	400	0.08
Designers*	0	120	0	0	120	0.03
Machinist	0	150	0	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	60	510	100	0	670	0.14
TOTAL FTEs:	0.13	0.28	0.06	0.00	0.14	

SALARY	\$3,194	\$16,294	\$5,325	\$0	\$24,813
FRINGE	\$1,229	\$6,661	\$2,050	\$0	\$9,940
TOTAL LABOR	\$4,423	\$22,955	\$7,375	\$0	\$34,753

MATERIAL

Lens holder	\$0	\$750	\$0	\$0	\$750
Material	\$0	\$250	\$0	\$0	\$250
Miscellaneous	\$0	\$1,000	\$0	\$0	\$1,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$2,000	\$0	\$0	\$2,000

CAPITAL EQUIPMENT

Optic Blank	\$8,378	\$19,550	\$0	\$0	\$27,928
Lens grinding, surfacing, and figuring	\$0	\$22,000	\$0	\$0	\$22,000
Coating	\$0	\$8,000	\$0	\$0	\$8,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$8,378	\$49,550	\$0	\$0	\$57,928

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$6,420	\$0	\$0	\$6,420
TOTAL	\$0	\$6,420	\$0	\$0	\$6,420

TOTAL DIRECT	\$12,803	\$80,932	\$7,375	\$0	\$101,110
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$12,803	\$80,932	\$7,375	\$0	\$101,110

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.4 Fold Mirror

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR-JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	45	180	75	0	300	0.06
Designers*	0	120	0	0	120	0.03
Machinist	0	100	50	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	45	400	125	0	570	0.12
TOTAL FTEs:	0.10	0.22	0.07	0.00	0.12	

SALARY	\$2,395	\$11,927	\$5,163	\$0	\$19,485
FRINGE	\$922	\$4,850	\$2,116	\$0	\$7,888
TOTAL LABOR	\$3,317	\$16,777	\$7,279	\$0	\$27,373

MATERIAL

Lens holder	\$0	\$750	\$0	\$0	\$750
Material	\$0	\$250	\$0	\$0	\$250
Miscellaneous	\$0	\$1,000	\$0	\$0	\$1,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$2,000	\$0	\$0	\$2,000

CAPITAL EQUIPMENT

Purchase Lens	\$0	\$7,500	\$0	\$0	\$7,500
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$7,500	\$0	\$0	\$7,500

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$6,420	\$0	\$0	\$6,420
TOTAL	\$0	\$6,420	\$0	\$0	\$6,420

TOTAL DIRECT	\$3,315	\$32,688	\$7,279	\$0	\$43,282
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$3,315	\$32,688	\$7,279	\$0	\$43,282

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

2.5 Fold Mirror Mechanism

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR-JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011-2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	30	120	50	0	200	0.04
Electronics Technician	0	0	40	0	40	0.01
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	120	0	0	120	0.03
Machinist	0	0	0	0	0	0.00
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	30	240	90	0	360	0.08
TOTAL FTEs:	0.07	0.13	0.05	0.00	0.08	
SALARY	\$1,292	\$5,170	\$3,333	\$0	\$9,795	
FRINGE	\$498	\$1,991	\$1,284	\$0	\$3,773	
TOTAL LABOR	\$1,790	\$7,161	\$4,617	\$0	\$13,568	

MATERIAL

Linear Encoder (1)	\$0	\$1,000	\$0	\$0	\$1,000	
Limit Sensors (11)	\$0	\$500	\$0	\$0	\$500	
Material	\$0	\$150	\$0	\$0	\$150	
Misc	\$0	\$300	\$0	\$0	\$300	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$1,950	\$0	\$0	\$1,950	

CAPITAL EQUIPMENT

Tip/Tilt Stage+Piston Piezo [Physik P-541.Z & P-2	\$0	\$11,743	\$0	\$0	\$11,743	
Controller, Power Supply [Physik E-500.0]	\$0	\$2,490	\$0	\$0	\$2,490	
Servo Modules [Physik E-509.S3 & E-509.C1A]	\$0	\$6,865	\$0	\$0	\$6,865	
Amplifier Modules [Physik E-503.0 & E-508.0]	\$0	\$4,772	\$0	\$0	\$4,772	
I/F Modules [Physik E516.i1 & E-516.i3]	\$0	\$7,135	\$0	\$0	\$7,135	
TOTAL	\$0	\$33,005	\$0	\$0	\$33,005	

TRAVEL

	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
Paradigm Design	\$0	\$0	\$0	\$0	\$0	
Bit7	\$0	\$6,420	\$0	\$0	\$6,420	
TOTAL	\$0	\$6,420	\$0	\$0	\$6,420	

TOTAL DIRECT	\$1,791	\$48,539	\$4,617	\$0	\$54,947	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$1,791	\$48,539	\$4,617	\$0	\$54,947	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

3.0 GRATING ASSEMBLY

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	100	0	100	0.02
Opto-mechanical Engineer, Jeff Wong*	45	180	75	0	300	0.06
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	150	0	0	150	0.03
Machinist	0	100	50	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	45	430	225	0	700	0.15
TOTAL FTEs:	0.10	0.24	0.13	0.00	0.15	
SALARY	\$0	\$2,346	\$4,118	\$0	\$6,464	
FRINGE	\$0	\$1,162	\$1,716	\$0	\$2,878	
TOTAL LABOR	\$0	\$3,508	\$5,834	\$0	\$9,342	

MATERIAL

Material	\$0	\$500	\$0	\$0	\$500
Holder	\$0	\$0	\$500	\$0	\$500
Bearings	\$0	\$0	\$500	\$0	\$500
Drive Screw	\$0	\$500	\$0	\$0	\$500
Drive Gear, coupling, or other device	\$0	\$300	\$0	\$0	\$300
Hall Sensors (6)	\$0	\$120	\$0	\$0	\$120
Miscellaneous	\$0	\$0	\$500	\$0	\$500
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$1,420	\$1,500	\$0	\$2,920

CAPITAL EQUIPMENT

Grating Insertion Actuator (1) [Ultramotion HT17]	\$0	\$750	\$0	\$0	\$750
Grating Absolute Encoder (1)	\$0	\$1,075	\$0	\$0	\$1,075
Grating Rotation Stage Actuator (2) [Physik M-037]	\$0	\$8,356	\$0	\$0	\$8,356
Grating Absolute Rotary Encoder (2)	\$0	\$2,150	\$0	\$0	\$2,150
Gratings	\$0	\$80,000	\$0	\$0	\$80,000
TOTAL	\$0	\$92,331	\$0	\$0	\$92,331

TRAVEL

Travel to vendor	\$0	\$1,441	\$0	\$0	\$1,441
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$1,441	\$0	\$0	\$1,441

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$3,375	\$13,500	\$5,625	\$0	\$22,500
Bit7	\$0	\$8,025	\$0	\$0	\$8,025
TOTAL	\$3,375	\$21,525	\$5,625	\$0	\$30,525

TOTAL DIRECT	\$3,375	\$120,225	\$12,959	\$0	\$136,559
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$3,375	\$120,225	\$12,959	\$0	\$136,559

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

4.0 FILTER & OPTICS STORAGE ASSEMBLY	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	100	0	100	0.02
Opto-mechanical Engineer, Jeff Wong*	60	240	100	0	400	0.08
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	150	0	0	150	0.03
Machinist	0	225	25	0	250	0.05
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	60	615	225	0	900	0.19
TOTAL FTEs:	0.13	0.34	0.13	0.00	0.19	
SALARY	\$0	\$5,279	\$3,532	\$0	\$8,811	
FRINGE	\$0	\$2,615	\$1,425	\$0	\$4,040	
TOTAL LABOR	\$0	\$7,894	\$4,957	\$0	\$12,851	

MATERIAL

Material	\$0	\$750	\$0	\$0	\$750
Storage optics drive screw	\$0	\$0	\$250	\$0	\$250
Storage optics bearing blocks	\$0	\$0	\$750	\$0	\$750
Filter insertion drive screw	\$0	\$0	\$250	\$0	\$250
Filter insertion bearings	\$0	\$0	\$250	\$0	\$250
Miscellaneous hardware	\$0	\$500	\$1,000	\$0	\$1,500
SolidWorks PDM (JPW)	\$2,300	\$500	\$0	\$0	\$2,800
Hall Sensor (60)	\$0	\$900	\$0	\$0	\$900
TOTAL	\$2,300	\$2,650	\$2,500	\$0	\$7,450

CAPITAL EQUIPMENT

F-P Order Blocking Filters	\$0	\$70,200	\$163,800	\$0	\$234,000
OSA Drive Actuator (2) [Ultramotion HT23]	\$0	\$1,900	\$0	\$0	\$1,900
OSA Absolute Position Encoder (2)	\$0	\$2,150	\$0	\$0	\$2,150
Filter Insertion & Lock Actuators (2) [Ultramotion]	\$0	\$1,500	\$0	\$0	\$1,500
Filter Absolute Position Encoder (1)	\$0	\$1,075	\$0	\$0	\$1,075
TOTAL	\$0	\$76,825	\$163,800	\$0	\$240,625

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$4,500	\$18,000	\$7,500	\$0	\$30,000
Bit7	\$0	\$8,025	\$0	\$0	\$8,025
TOTAL	\$4,500	\$26,025	\$7,500	\$0	\$38,025

TOTAL DIRECT	\$6,800	\$113,396	\$178,757	\$0	\$298,953
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$6,800	\$113,396	\$178,757	\$0	\$298,953

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

5.0 FABRY-PEROT ETALON

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	160	0	160	0.03
Opto-mechanical Engineer, Jeff Wong*	60	240	100	0	400	0.08
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	150	0	0	150	0.03
Machinist	0	150	50	0	200	0.04
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	75	75	0	0	150	0.03
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	135	615	310	0	1,060	0.22
TOTAL FTEs:	0.30	0.34	0.17	0.00	0.22	

SALARY	\$6,890	\$10,409	\$5,885	\$0	\$23,184
FRINGE	\$2,653	\$4,396	\$2,397	\$0	\$9,446
TOTAL LABOR	\$9,543	\$14,805	\$8,282	\$0	\$32,630

MATERIAL

Material	\$0	\$750	\$0	\$0	\$750
Bearings & precision guides	\$0	\$1,000	\$0	\$0	\$1,000
Drive shaft	\$0	\$500	\$0	\$0	\$500
Miscellaneous	\$0	\$750	\$250	\$0	\$1,000
Hall Sensors (6)	\$0	\$90	\$0	\$0	\$90
Pneumatic Lock (3)	\$0	\$900	\$0	\$0	\$900
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$3,990	\$250	\$0	\$4,240

CAPITAL EQUIPMENT

F-P Insertion Actuator (1) [Ultramotion HT23]	\$0	\$950	\$0	\$0	\$950
F-P Absolute Encoder (1)	\$0	\$1,075	\$0	\$0	\$1,075
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$2,025	\$0	\$0	\$2,025

TRAVEL

Observe Fabry-Perot testing	\$1,758	\$0	\$0	\$0	\$1,758
Support RSS-VIS F-P Testing	\$0	\$3,708	\$0	\$0	\$3,708
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$1,758	\$3,708	\$0	\$0	\$5,466

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$4,500	\$18,000	\$7,500	\$0	\$30,000
Bit7	\$0	\$8,025	\$0	\$0	\$8,025
TOTAL	\$4,500	\$26,025	\$7,500	\$0	\$38,025

TOTAL DIRECT	\$15,801	\$50,553	\$16,032	\$0	\$82,386
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$15,801	\$50,553	\$16,032	\$0	\$82,386

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

6.0 POLARIZING BEAM SPLITTER

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	225	0	0	0	225	0.05
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	45	180	75	0	300	0.06
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	100	0	0	100	0.02
Machinist	0	125	50	0	175	0.04
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	270	405	125	0	800	0.17
TOTAL FTEs:	0.60	0.23	0.07	0.00	0.17	

SALARY	\$9,693	\$2,933	\$1,174	\$0	\$13,800
FRINGE	\$3,733	\$1,453	\$582	\$0	\$5,768
TOTAL LABOR	\$13,426	\$4,386	\$1,756	\$0	\$19,568

MATERIAL

Material	\$0	\$750	\$0	\$0	\$750
Frame	\$0	\$500	\$0	\$0	\$500
Insertion mechanism, pneumatic (2)	\$0	\$1,000	\$0	\$0	\$1,000
Hall Sensors (3)	\$0	\$45	\$0	\$0	\$45
Miscellaneous	\$0	\$1,250	\$0	\$0	\$1,250
Guide rails and bearings	\$0	\$1,200	\$0	\$0	\$1,200
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$4,745	\$0	\$0	\$4,745

CAPITAL EQUIPMENT

Polarizing beam splitter	\$0	\$16,500	\$38,500	\$0	\$55,000
Coating	\$0	\$0	\$5,000	\$0	\$5,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$16,500	\$43,500	\$0	\$60,000

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$3,375	\$13,500	\$5,625	\$0	\$22,500
Bit7	\$0	\$5,350	\$0	\$0	\$5,350
TOTAL	\$3,375	\$18,850	\$5,625	\$0	\$27,850

TOTAL DIRECT	\$16,800	\$44,481	\$50,881	\$0	\$112,162
TOTAL INDIRECT	\$7,560	\$12,591	\$3,321	\$0	\$23,473
TOTAL	\$24,360	\$57,072	\$54,202	\$0	\$135,635

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

7.0 CAMERA SUBASSEMBLY

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	75	600	250	0	925	0.19
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	105	420	175	0	700	0.15
Designers*	0	250	0	0	250	0.05
Machinist	0	450	150	0	600	0.13
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	180	1,720	575	0	2,475	0.52
TOTAL FTEs:	0.40	0.96	0.32	0.00	0.52	

SALARY	\$8,820	\$58,762	\$23,604	\$0	\$91,186
FRINGE	\$3,396	\$23,789	\$9,478	\$0	\$36,663
TOTAL LABOR	\$12,216	\$82,551	\$33,082	\$0	\$127,849

MATERIAL

Material & Misc H/W	\$0	\$1,800	\$1,200	\$0	\$3,000
Gearbox, drive gear, precision bearings/rollers	\$0	\$4,000	\$0	\$0	\$4,000
Pneumatic Lock, Articulation	\$0	\$500	\$0	\$0	\$500
Camera Focus Linear Encoder (2)	\$0	\$1,500	\$0	\$0	\$1,500
Limit Switches (5)	\$0	\$375	\$0	\$0	\$375
Hall Sensors (6)	\$0	\$90	\$0	\$0	\$90
Articulation Actuator (2) [Dynatec Sys BL2330]	\$0	\$2,200	\$0	\$0	\$2,200
Articulation Position Encoder, Absolute (2)	\$0	\$2,500	\$0	\$0	\$2,500
Solidworks & S/W PDM (WPS)	\$2,550	\$1,250	\$0	\$0	\$3,800
TOTAL	\$2,550	\$14,215	\$1,200	\$0	\$17,965

CAPITAL EQUIPMENT

Optical blanks & Witness Samples(7)	\$40,196	\$87,371	\$0	\$0	\$127,567
Lens fabrication	\$0	\$77,000	\$0	\$0	\$77,000
Lens coating	\$0	\$28,000	\$0	\$0	\$28,000
Camera Focus Actuator (1) [Physic M-235]	\$0	\$3,373	\$0	\$0	\$3,373
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$40,196	\$195,744	\$0	\$0	\$235,940

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

Cryogenic Refracture Index Measurements, S-LA	\$0	\$15,000	\$0	\$0	\$15,000
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$13,375	\$0	\$0	\$13,375
TOTAL	\$0	\$28,375	\$0	\$0	\$28,375

TOTAL DIRECT	\$54,962	\$320,885	\$34,282	\$0	\$410,129
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$54,962	\$320,885	\$34,282	\$0	\$410,129

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

8.0 DETECTOR / DEWAR ASSEMBLY

LABOR	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	75	600	250	0	925	0.19
Electronics Technician	0	20	100	0	120	0.03
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	450	1,800	750	0	3,000	0.63
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	100	0	0	100	0.02
Machinist	0	600	0	0	600	0.13
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	525	3,120	1,100	0	4,745	0.99
TOTAL FTEs:	1.17	1.73	0.61	0.00	0.99	

SALARY	\$17,870	\$99,067	\$38,115	\$0	\$155,052
FRINGE	\$6,878	\$39,689	\$14,670	\$0	\$61,237
TOTAL LABOR	\$24,748	\$138,756	\$52,785	\$0	\$216,289

MATERIAL

CPU Workstation	\$3,000	\$0	\$0	\$0	\$3,000
Software and IDL licensing	\$2,000	\$0	\$0	\$0	\$2,000
Material	\$0	\$1,000	\$0	\$0	\$1,000
Filter wheel actuator [Phytron]	\$0	\$1,500	\$0	\$0	\$1,500
Filter wheel encoder, absolute	\$0	\$1,250	\$0	\$0	\$1,250
Cryocooler Compressor & Fittings	\$0	\$11,500	\$0	\$0	\$11,500
Hall Sensors & Misc	\$0	\$810	\$3,000	\$0	\$3,810
Temperature sensors & controller	\$0	\$8,000	\$0	\$0	\$8,000
Cabling	\$0	\$4,500	\$0	\$0	\$4,500
TOTAL	\$5,000	\$28,560	\$3,000	\$0	\$36,560

CAPITAL EQUIPMENT

SG H2RG FPA	\$150,000	\$200,000	\$0	\$0	\$350,000
EG H2RG FPA	\$20,000	\$30,000	\$0	\$0	\$50,000
Sidecar - Bare Mux, Cryo & Room Temp	\$20,000	\$47,000	\$0	\$0	\$67,000
Bare Mux	\$6,400	\$18,600	\$0	\$0	\$25,000
Filters	\$0	\$20,000	\$0	\$0	\$20,000
TOTAL	\$196,400	\$315,600	\$0	\$0	\$512,000

TRAVEL

Steve Smee to Madison	\$980	\$980	\$0	\$0	\$1,960
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$980	\$980	\$0	\$0	\$1,960

SUBCONTRACTS / SERVICES

Detector training	\$0	\$28,000	\$0	\$0	\$28,000
Dr. Stephen Smee	\$9,300	\$58,800	\$20,600	\$0	\$88,700
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$5,350	\$0	\$0	\$5,350
TOTAL	\$9,300	\$92,150	\$20,600	\$0	\$122,050

TOTAL DIRECT	\$236,428	\$576,046	\$76,385	\$0	\$888,859
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$236,428	\$576,046	\$76,385	\$0	\$888,859

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

9.0 PREDEWAR SUBASSEMBLY

LABOR	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	45	180	75	0	300	0.06
Electronics Technician	0	35	175	0	210	0.04
Opto-mechanical Engineer, Jeff Wong*	15	60	25	0	100	0.02
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	105	420	175	0	700	0.15
Designers*	105	420	175	0	700	0.15
Machinist	0	0	200	0	200	0.04
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	270	990	480	0	1,740	0.36

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	540	2,105	1,305	0	3,950	0.82
TOTAL FTEs:	1.20	1.17	0.73	0.00	0.82	

SALARY	\$10,136	\$40,705	\$27,030	\$0	\$77,871
FRINGE	\$2,990	\$12,326	\$9,301	\$0	\$24,617
TOTAL LABOR	\$13,126	\$53,031	\$36,331	\$0	\$102,488

MATERIAL

Materials - thermal insulating	\$0	\$3,000	\$0	\$0	\$3,000
Materials - structural	\$0	\$1,000	\$0	\$0	\$1,000
Enclosure thermal control (heaters, controller, wiring)	\$0	\$3,000	\$0	\$0	\$3,000
Baffling coatings - paint	\$0	\$1,000	\$0	\$0	\$1,000
Pneumatics (3) & Misc. H/W	\$0	\$3,500	\$3,000	\$0	\$6,500
Thermocouples & Hall Sensors (6)	\$0	\$1,090	\$0	\$0	\$1,090
SolidWorks Licenses - Renewals (DPA/ARR)	\$540	\$750	\$0	\$0	\$1,290
PDM Licenses - Renewals (ARR)	\$2,300	\$500	\$0	\$0	\$2,800
CAD CPU & Monitor	\$3,000	\$3,000	\$0	\$0	\$6,000
TOTAL	\$5,840	\$16,840	\$3,000	\$0	\$25,680

CAPITAL EQUIPMENT

Baffling coating - plating	\$0	\$5,000	\$0	\$0	\$5,000
Chiller - FTS ULT Series RC210	\$0	\$32,000	\$0	\$0	\$32,000
Chilller plumbing	\$0	\$7,500	\$0	\$0	\$7,500
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$44,500	\$0	\$0	\$44,500

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

Thermal Analyst	\$5,000	\$25,000	\$0	\$0	\$30,000
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$1,125	\$4,500	\$1,875	\$0	\$7,500
Bit7	\$5,618	\$22,470	\$9,363	\$0	\$37,450
TOTAL	\$11,743	\$51,970	\$11,238	\$0	\$74,950

TOTAL DIRECT	\$30,709	\$166,341	\$50,569	\$0	\$247,618
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$30,709	\$166,341	\$50,569	\$0	\$247,618

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

10.0 RSS COMMON OPTICS ENVIRONMENTAL CONTROL LABOR	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershad	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	75	300	125	0	500	0.10
Designers*	0	0	0	0	0	0.00
Machinist	0	75	75	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00
<i>*Labor costs for these resources are presened in Subcontracts/Services.</i>						
TOTAL HOURS:	75	375	200	0	650	0.14
TOTAL FTEs:	0.17	0.21	0.11	0.00	0.14	
SALARY	\$3,992	\$17,729	\$8,414	\$0	\$30,135	
FRINGE	\$1,537	\$7,019	\$3,432	\$0	\$11,988	
TOTAL LABOR	\$5,529	\$24,748	\$11,846	\$0	\$42,123	
MATERIAL						
Sensors	\$0	\$1,500	\$0	\$0	\$1,500	
Circulation fans	\$0	\$750	\$0	\$0	\$750	
Air lines & fitting hardware	\$0	\$1,500	\$0	\$0	\$1,500	
Miscellaneous.	\$500	\$750	\$250	\$0	\$1,500	
Gold coat trial runs	\$5,000	\$0	\$0	\$0	\$5,000	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$5,500	\$4,500	\$250	\$0	\$10,250	
CAPITAL EQUIPMENT						
Gold coatings	\$0	\$0	\$20,000	\$0	\$20,000	
Material (high thermal conductivity composite)	\$0	\$0	\$8,000	\$0	\$8,000	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$28,000	\$0	\$28,000	
TRAVEL						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
SUBCONTRACTS / SERVICES						
	\$0	\$0	\$0	\$0	\$0	
	\$0	\$0	\$0	\$0	\$0	
Paradigm Design	\$0	\$0	\$0	\$0	\$0	
Bit7	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$0	\$0	\$0	\$0	\$0	
TOTAL DIRECT	\$11,029	\$29,248	\$40,096	\$0	\$80,373	
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0	
TOTAL	\$11,029	\$29,248	\$40,096	\$0	\$80,373	

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

11.0 CONTROL SYSTEM

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershadly	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	500	250	0	750	0.16
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	225	900	375	0	1,500	0.31
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	225	0	0	225	0.05
Machinist	0	0	225	0	225	0.05
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	225	900	375	0	1,500	0.31
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	450	2,525	1,225	0	4,200	0.88
TOTAL FTEs:	1.00	1.40	0.68	0.00	0.88	
SALARY	\$12,382	\$64,252	\$33,278	\$0	\$109,912	
FRINGE	\$4,766	\$24,732	\$13,394	\$0	\$42,892	
TOTAL LABOR	\$17,148	\$88,984	\$46,672	\$0	\$152,804	

MATERIAL

Enclosure material	\$0	\$500	\$0	\$0	\$500
Additional sensors	\$0	\$1,200	\$0	\$0	\$1,200
Cabling	\$0	\$5,000	\$1,000	\$0	\$6,000
Labview Software Licensing	\$1,200	\$1,200	\$0	\$0	\$2,400
PC Boards	\$0	\$7,500	\$0	\$0	\$7,500
Miscellaneous	\$0	\$11,500	\$2,500	\$0	\$14,000
Computer Hardware	\$3,000	\$3,000	\$0	\$0	\$6,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$4,200	\$29,900	\$3,500	\$0	\$37,600

CAPITAL EQUIPMENT

Motor Controller & Motion Control Boards	\$0	\$19,500	\$0	\$0	\$19,500
DAQ and I/O hardware	\$0	\$7,500	\$0	\$0	\$7,500
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$27,000	\$0	\$0	\$27,000

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
Diron Technologies	\$20,250	\$81,000	\$33,750	\$0	\$135,000
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$12,038	\$0	\$0	\$12,038
TOTAL	\$20,250	\$93,038	\$33,750	\$0	\$147,038

TOTAL DIRECT	\$41,598	\$238,922	\$83,922	\$0	\$364,442
TOTAL INDIRECT	\$0	\$0	\$0	\$0	\$0
TOTAL	\$41,598	\$238,922	\$83,922	\$0	\$364,442

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

12.0 POWER DISTRIBUTION

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	60	360	150	0	570	0.12
Lead Mechanical Engineer, Mike Smith	0	0	0	0	0	0.00
Electronics Technician	0	160	200	0	360	0.08
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	120	0	0	120	0.03
Machinist	0	0	150	0	150	0.03
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	60	640	500	0	1,200	0.25
TOTAL FTEs:	0.13	0.36	0.28	0.00	0.25	

SALARY	\$5,400	\$37,112	\$22,911	\$0	\$65,423
FRINGE	\$0	\$1,814	\$4,011	\$0	\$5,825
TOTAL LABOR	\$5,400	\$38,926	\$26,922	\$0	\$71,248

MATERIAL

Power Supplies	\$0	\$7,500	\$0	\$0	\$7,500
PC Boards	\$0	\$7,500	\$0	\$0	\$7,500
Cabling	\$0	\$5,000	\$0	\$0	\$5,000
Material	\$0	\$500	\$0	\$0	\$500
Heat sinks	\$0	\$500	\$0	\$0	\$500
Miscellaneous Hardware	\$0	\$4,000	\$4,000	\$0	\$8,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$25,000	\$4,000	\$0	\$29,000

CAPITAL EQUIPMENT

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$6,420	\$0	\$0	\$6,420
TOTAL	\$0	\$6,420	\$0	\$0	\$6,420

TOTAL DIRECT	\$5,400	\$70,348	\$30,922	\$0	\$106,670
TOTAL INDIRECT	\$2,430	\$31,657	\$13,915	\$0	\$48,002
TOTAL	\$7,830	\$102,005	\$44,837	\$0	\$154,672

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

13.0 SUPPORT AND TEST EQUIPMENT

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	0	0	0.00
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	80	50	0	130	0.03
Lead Mechanical Engineer, Mike Smith	0	300	125	0	425	0.09
Electronics Technician	0	10	50	0	60	0.01
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	0	0	0.00
Postdoc, Ryan Doering	0	0	0	0	0	0.00
Mechanical Engineer, Bill Mason	0	0	0	0	0	0.00
Designers*	0	100	50	0	150	0.03
Machinist	0	100	250	0	350	0.07
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	0	0	0.00
Undergraduate Students	0	500	250	0	750	0.16

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	0	1,090	775	0	1,865	0.39
TOTAL FTEs:	0.00	0.61	0.43	0.00	0.39	

SALARY	\$0	\$27,595	\$19,640	\$0	\$47,235
FRINGE	\$0	\$6,422	\$5,630	\$0	\$12,052
TOTAL LABOR	\$0	\$34,017	\$25,270	\$0	\$59,287

MATERIAL

Material	\$0	\$1,500	\$3,500	\$0	\$5,000
Testing Computer support hardware	\$0	\$5,000	\$0	\$0	\$5,000
Software and licensing	\$0	\$3,000	\$0	\$0	\$3,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$9,500	\$3,500	\$0	\$13,000

CAPITAL EQUIPMENT

Test setup optics & lamps	\$0	\$0	\$10,000	\$0	\$10,000
Throughput test equipment	\$0	\$0	\$10,000	\$0	\$10,000
Other test equipment	\$0	\$0	\$30,000	\$0	\$30,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$50,000	\$0	\$50,000

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$5,350	\$2,675	\$0	\$8,025
TOTAL	\$0	\$5,350	\$2,675	\$0	\$8,025

TOTAL DIRECT	\$0	\$48,867	\$81,445	\$0	\$130,312
TOTAL INDIRECT	\$0	\$21,992	\$14,150	\$0	\$36,142
TOTAL	\$0	\$70,859	\$95,595	\$0	\$166,454

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

14.0 INTEGRATION, VERIFICATION, AND TESTING	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009	2009-2010	2010-2011	2011 - 2012	TOTAL	Ave FTE Project Life
	APR - JUN	JUL - JUN	JUL - JUN	JUL - MAR		
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	1,050	0	1,050	0.22
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	0	0	0.00
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	1,050	0	1,050	0.22
Electronics Technician	0	0	105	0	105	0.02
Opto-mechanical Engineer, Jeff Wong*	0	0	280	0	280	0.06
Software Programmer, Jeff Percival	0	0	770	0	770	0.16
Postdoc, Ryan Doering	0	0	1,050	0	1,050	0.22
Mechanical Engineer, Bill Mason	0	0	525	0	525	0.11
Designers*	0	0	0	0	0	0.00
Machinist	0	0	0	0	0	0.00
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	75	0	75	0.02
Controls Engineer, Ron Koch*	0	0	350	0	350	0.07
Graduate Students	0	0	1,050	0	1,050	0.22
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	0	0	6,305	0	6,305	1.31
TOTAL FTEs:	0.00	0.00	3.50	0.00	1.31	

SALARY	\$0	\$0	\$221,076	\$0	\$221,076
FRINGE	\$0	\$0	\$81,025	\$0	\$81,025
TOTAL LABOR	\$0	\$0	\$302,101	\$0	\$302,101

MATERIAL

Miscellaneous Expenses	\$0	\$0	\$10,000	\$0	\$10,000
Labview Software License	\$0	\$0	\$1,200	\$0	\$1,200
SolidWorks Licenses - Renewals	\$0	\$0	\$4,500	\$0	\$4,500
PDM Licenses - Renewals	\$0	\$0	\$2,000	\$0	\$2,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$17,700	\$0	\$17,700

CAPITAL EQUIPMENT

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

TRAVEL

	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$0	\$0

SUBCONTRACTS / SERVICES

Tuition Remission	\$0	\$0	\$10,680	\$0	\$10,680
Diron Technologies	\$0	\$0	\$31,500	\$0	\$31,500
Paradigm Design	\$0	\$0	\$21,000	\$0	\$21,000
Bit7	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$63,180	\$0	\$63,180

TOTAL DIRECT	\$0	\$0	\$382,981	\$0	\$382,981
TOTAL INDIRECT	\$0	\$0	\$167,535	\$0	\$167,535
TOTAL	\$0	\$0	\$550,516	\$0	\$550,516

**NEAR INFRARED SPECTROGRAPH FOR SALT
BUDGET ESTIMATE**

15.0 COMMISSIONING

	PY01	PY02	PY03	PY04	O/H RATE: 45.0%	
	2008-2009 APR - JUN	2009-2010 JUL - JUN	2010-2011 JUL - JUN	2011 - 2012 JUL - MAR	TOTAL	Ave FTE Project Life
LABOR						
Principal Investigator, Andrew Sheinis	0	0	0	0	0	0.00
Project Scientist, Marsha Wolf	0	0	0	750	750	0.16
Co-Investigator, Matt Bershady	0	0	0	0	0	0.00
Co-Investigator, Amy Barger	0	0	0	0	0	0.00
Sr. Scientist Advisor, Ken Nordsieck	0	0	0	0	0	0.00
Project Manager, Mark Mulligan	0	0	0	0	0	0.00
Quality Assurance & Safety Manager, Tom Demke	0	0	0	0	0	0.00
Systems Engineer, Don Thielman	0	0	0	450	450	0.09
Electrical Engineer, Paul Sendelbach	0	0	0	0	0	0.00
Lead Mechanical Engineer, Mike Smith	0	0	0	450	450	0.09
Electronics Technician	0	0	0	0	0	0.00
Opto-mechanical Engineer, Jeff Wong*	0	0	0	0	0	0.00
Software Programmer, Jeff Percival	0	0	0	375	375	0.08
Postdoc, Ryan Doering	0	0	0	225	225	0.05
Mechanical Engineer, Bill Mason	0	0	0	450	450	0.09
Designers*	0	0	0	0	0	0.00
Machinist	0	0	0	0	0	0.00
Instructor	0	0	0	0	0	0.00
Co-Investigator, Ted Williams	0	0	0	0	0	0.00
Controls Engineer, Ron Koch*	0	0	0	0	0	0.00
Graduate Students	0	0	0	750	750	0.16
Undergraduate Students	0	0	0	0	0	0.00

*Labor costs for these resources are presented in Subcontracts/Services.

TOTAL HOURS:	0	0	0	3,450	3,450	0.72
TOTAL FTEs:	0.00	0.00	0.00	4.60	0.72	

SALARY	\$0	\$0	\$0	\$141,305	\$141,305
FRINGE	\$0	\$0	\$0	\$51,484	\$51,484
TOTAL LABOR	\$0	\$0	\$0	\$192,789	\$192,789

MATERIAL

Miscellaneous equipment / expenses	\$0	\$0	\$0	\$10,500	\$10,500
Shipping container and packing materials	\$0	\$0	\$0	\$2,500	\$2,500
SolidWorks Licenses - Renewals	\$0	\$0	\$0	\$4,500	\$4,500
PDM Licenses - Renewals	\$0	\$0	\$0	\$0	\$0
LabView Renewal	\$0	\$0	\$0	\$500	\$500
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$18,000	\$18,000

CAPITAL EQUIPMENT

Instrument Shipping	\$0	\$0	\$0	\$10,000	\$10,000
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$10,000	\$10,000

TRAVEL

Commissioning (Integrate)	\$0	\$0	\$0	\$9,113	\$9,113
Commissioning (Integrate & Test)	\$0	\$0	\$0	\$34,476	\$34,476
Commissioning (Integrate, Test, Comm, & Train)	\$0	\$0	\$0	\$51,714	\$51,714
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$95,303	\$95,303

SUBCONTRACTS / SERVICES

Tuition Remission	\$0	\$0	\$0	\$8,900	\$8,900
Diron Technologies	\$0	\$0	\$0	\$0	\$0
Paradigm Design	\$0	\$0	\$0	\$0	\$0
Bit7	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$0	\$8,900	\$8,900

TOTAL DIRECT	\$0	\$0	\$0	\$324,992	\$324,992
TOTAL INDIRECT	\$0	\$0	\$0	\$137,741	\$137,741
TOTAL	\$0	\$0	\$0	\$462,733	\$462,733