

PRECISION RADIAL VELOCITY SPECTROMETER

Document Title	PRVS Pricing Details
Document Number	PRVS-BDG-00001-0001
Issue	1.0
Date	21 September 2006

Document Prepared By:	David Lunney	Signature and Date	David Lunney 21 September 2006
Document Approved By:	Ian Bryson	Signature and Date	Ian Bryson 21 September 2006
Document Released By:	Ian Robson	Signature and Date	Ian Robson 21 September 2006

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

CHANGE RECORD

Issue	Date	Section affected	Change Description
1.0	21 September 2006	All	First issue

APPLICABLE DOCUMENTS

Reference	Document Title	Document Number	Issue/Date
AD1	Statement of Work	Workscope 0084699-GEM01056, Exhibit A	06 Jan 2006
AD2	PRVS Management Plan	PRVS-PLA-00003-0001	1.0
AD3	PRVS Pricing Information	PRVS-BDG-00002-0001	1.0

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

TABLE OF CONTENTS

1. INTRODUCTION	4
2. WORK BREAKDOWN STRUCTURE.....	5
2.1 WBS DETAIL FOR DESIGN PHASES	5
2.2 WBS DETAIL #1 FOR BUILD/SUB-SYSTEM AIV	6
2.3 WBS DETAIL #2 FOR BUILD/SUB-SYSTEM AIV	7
2.4 WBS DETAIL #4 FOR BUILD/SUB-SYSTEM AIV	8
2.5 WBS DETAIL FOR SYSTEM AIV AND COMMISSIONING	9
2.6 WBS DETAIL FOR OVERSIGHT ACTIVITIES	10
3. DETAILED WBS SHEETS	11
3.1 OVERALL SUMMARY – WBS 00.00.00	11
3.2 LEVEL 1 SUMMARY - PRELIMINARY DESIGN (B0.00.00)	12
3.3 LEVEL 1 SUMMARY - DETAILED DESIGN (C0.00.00)	13
3.4 LEVEL 1 SUMMARY - SUB-SYSTEM ASSEMBLY AND AIV (D0.00.00)	14
3.4.1 Level 2 Summary - Fibre Deployment (D0.01.00).....	15
3.4.2 Level 2 Summary - Infrastructure (D0.02.00).....	16
3.4.3 Level 2 Summary - Fore-Optics Fibre Assembly (D0.03.00).....	17
3.4.4 Level 2 Summary - Spectrograph Assembly (D0.04.00)	18
3.4.5 Level 2 Summary - Calibration Assembly (D0.05.00)	19
3.4.6 Level 2 Summary – (Data Pipeline D0.06.00)	20
3.4.7 Level 2 Summary - Instrument Control System (D0.07.00)	21
3.5 LEVEL 1 SUMMARY - INSTRUMENT INTEGRATION & VERIFICATION (E0.00.00)	22
3.6 LEVEL 1 SUMMARY - COMMISSIONING (F0.00.00).....	23
3.7 LEVEL 1 SUMMARY - SYSTEMS ENGINEERING (SE.00.00)	24
3.8 LEVEL 1 SUMMARY - SCIENCE (SC.00.00).....	25
3.9 LEVEL 1 SUMMARY - PROJECT MANAGEMENT (PM.00.00)	26
4. LEVEL 1 EFFORT PROFILES	27

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

1. INTRODUCTION

This document presents additional information on the Cost of the proposed PRVS Instrument. This is provided in the form of Work Breakdown description sheets for the main elements of the work proposed by the UK ATC led Consortium. The main information is available in the pricing document (AD 03).

All the WBS sheets include working allowance and Contingency values as described in other documents. Please note that these values will be used for the Consortium to manage the internal allocation of funds within the Consortium and are not directly equivalent to the formulaic values of 'Internal Contingency' and 'AURA reserve' defined by the proposed Phase 2 Contract.

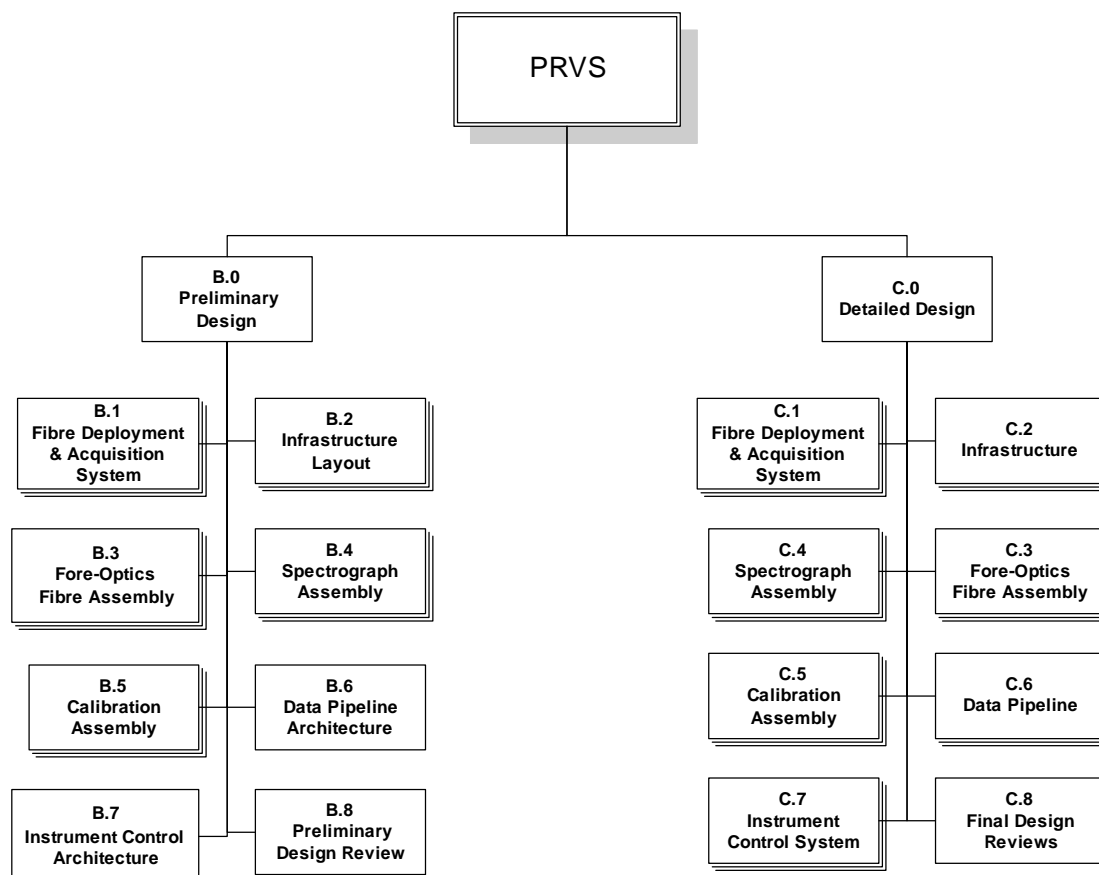
PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

2. WORK BREAKDOWN STRUCTURE

In this section we show diagrammatically the full Work Breakdown Structure to lower levels.

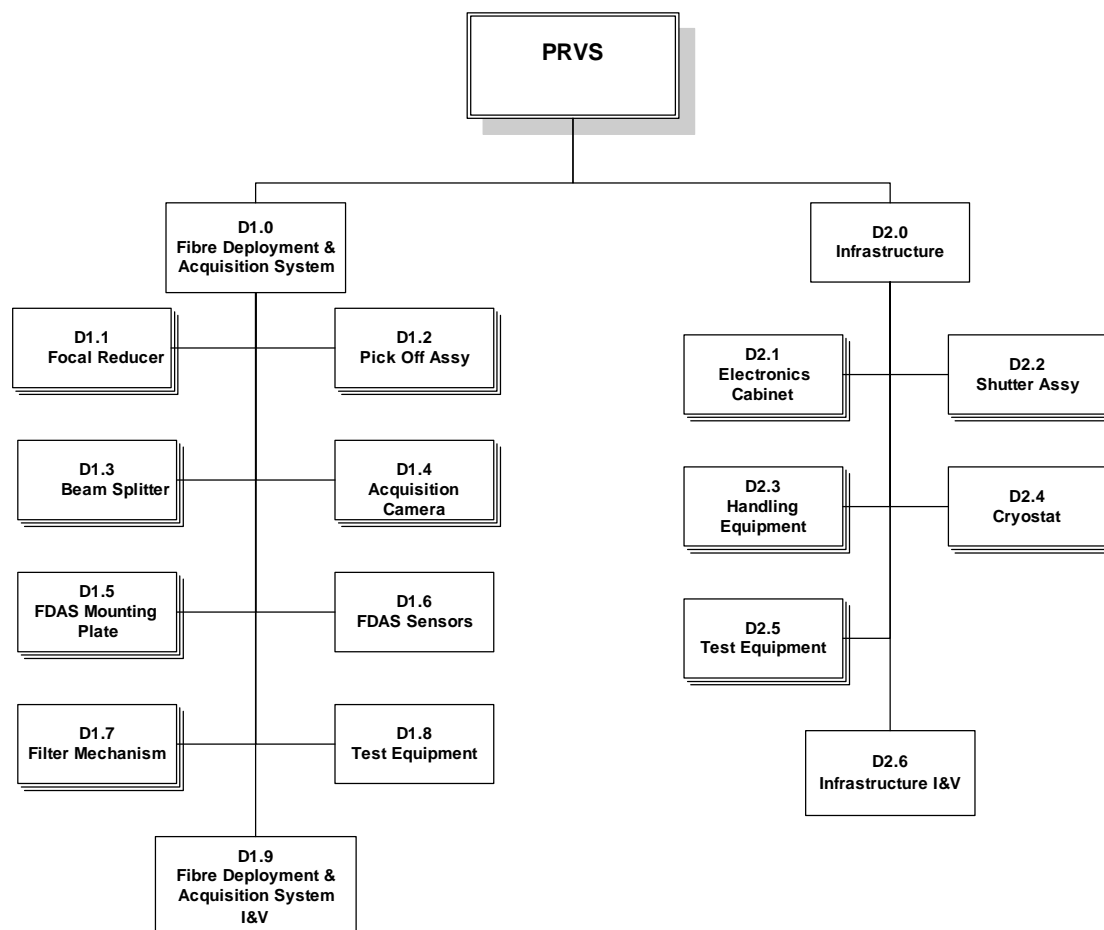
2.1 WBS DETAIL FOR DESIGN PHASES



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

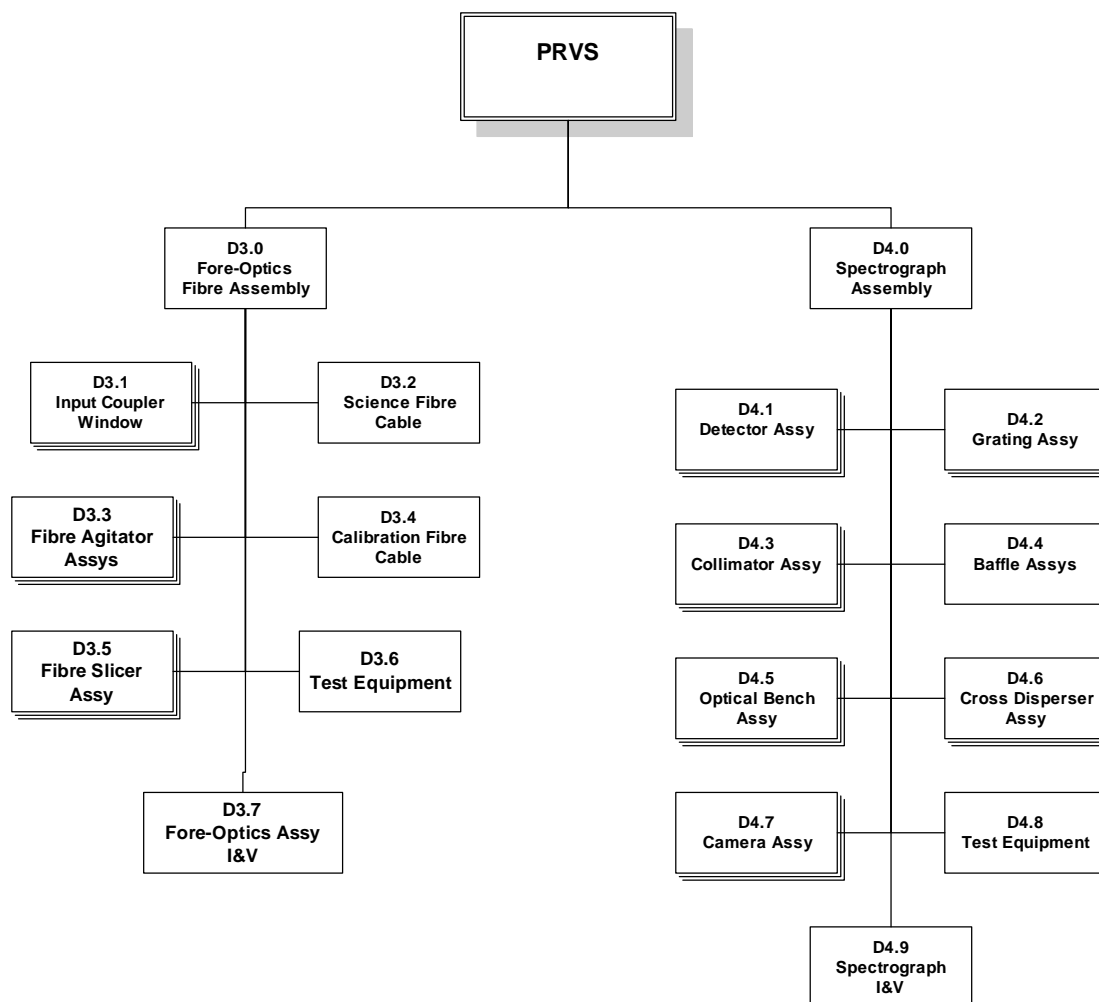
2.2 WBS DETAIL #1 FOR BUILD/SUB-SYSTEM AIV



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

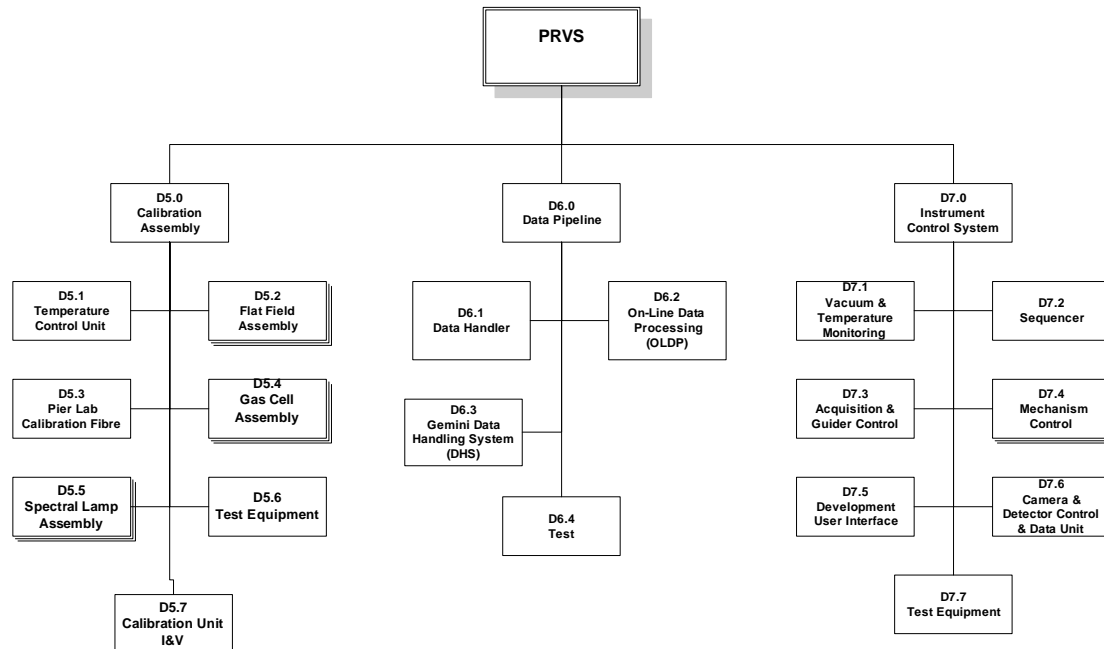
2.3 WBS DETAIL #2 FOR BUILD/SUB-SYSTEM AIV



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

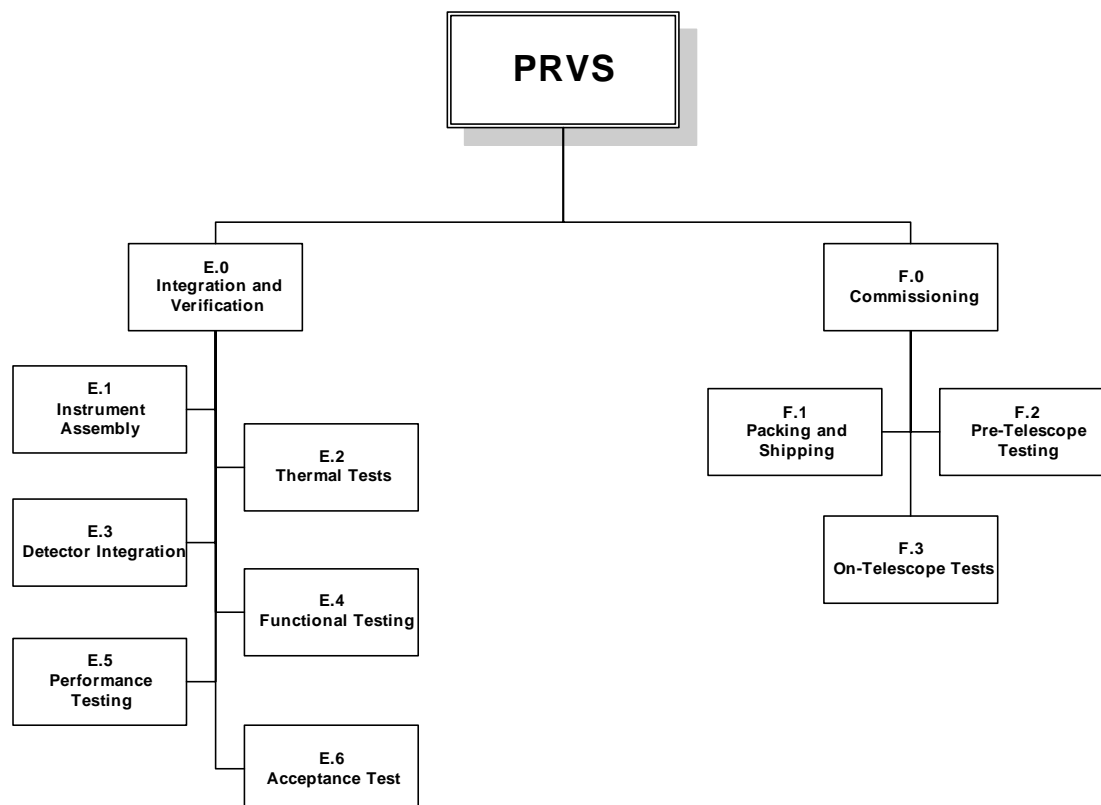
2.4 WBS DETAIL #4 FOR BUILD/SUB-SYSTEM AIV



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

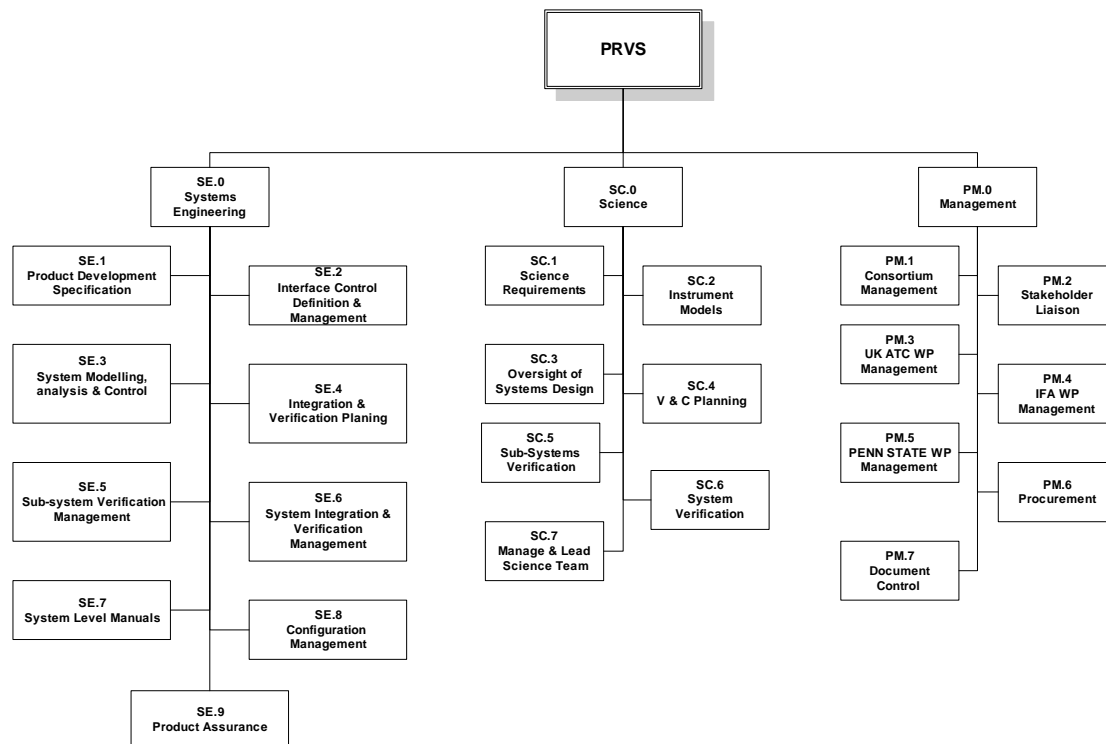
2.5 WBS DETAIL FOR SYSTEM AIV AND COMMISSIONING



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

2.6 WBS DETAIL FOR OVERSIGHT ACTIVITIES



PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3. DETAILED WBS SHEETS

3.1 OVERALL SUMMARY – WBS 00.00.00

Work Package Description				
Project:	PRVS	Issue:	1	
WP Title:	INSTRUMENT	Date:	01 September 2006	
WP Start Event:	PROJECT START	WP Ref No:	0	0
WP End Event:	READY FOR SCIENCE VERIFICATION		0	
WP Owner:	DAVID LUNNEY	Organisation Responsible:	UK ATC	

Aims of WP:	
1	Gather full Requirements and review design Options
2	Design Instrument meeting requirements and review
3	Build Instrument and verify performance at home Institute
4	Deliver to telescope and Confirm performance on Sky
5	Provide documentation as required

Inputs to WP:	
1	Proposal
2	Science Case
3	
4	
5	
6	

WP Tasks:		Duration	Effort (weeks)			Material		
		(Cal Weeks)	Total	ATC	PSU/IFA	Total	£k	\$k
B0	PRELIMINARY DESIGN	0	310.8	146	164.8	24.65458	0	46.93
C0	DETAILED DESIGN PHASE	0	223.3	124	99.3	485.6765	50.163	829
D0	SUB-ASSEMBLY AIV	0	218.4	115	103.4	625.4879	353.2	518.3
E0	INTEGRATION & VERIFICATION	0	207.8	165	42.8	0	0	0
F0	COMMISSIONING	0	112	92	20	98.9	98.9	0
SE	SYSTEMS ENGINEERING	0	76	76	0	0	0	0
SC	SCIENCE	0	136	94	42	81.52088	50	60
PM	PROJECT MANAGEMENT	0	177.8	160	17.8	82.02088	50.5	60
WP Sub-Totals:			1462.1	972	490.1	1398.261	602.763	1514.23
Working Allowance			145	97	48	148.3327	64.96	158.7
Total Inc. Working Allowance			1607.1	1069	538.1	1546.594	667.723	1672.93
Contingency			156	106	50	145.3383	64.96	153
Total inc. allowance & contingency			1763.1	1175	588.1	1691.932	732.683	1825.93

Outputs of WP:	
1	Fully Operational System
2	Acceptance Test reports
3	Final System Budgets
4	Final Versions of Design, User and Maintenance Manuals
5	Special Test, assembly and Handling equipment
6	Spares as agreed (cost will be covered via separate contract)

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.2 LEVEL 1 SUMMARY - PRELIMINARY DESIGN (B0.00.00)

Work Package Description							
Project:		PRVS		Issue:		1	
WP Title:		PRELIMINARY DESIGN		Date:		17 September 2006	
WP Start Event:		Project Start		WP Ref No:		B0 0 0	
WP End Event:		Preliminary Design Review					
WP Owner:		DAVID LUNNEY		Organisation Responsible:		UK ATC	
Aims of WP:							
1	Produce a high quality PDR documentation pack and complete preliminary design to satisfaction of the customer						
2	Produce a revised cost & schedule for the instrument based on detailed information derived during preliminary design phase						
3	Produce a more detailed & accurate risk assessment						
4	Begin procurement of long lead items as required by schedule						
5	0						
Inputs to WP:							
1	List of deliverable PDR documentation						
2	Signed contract with formally agreed project start date						
3	Agreed Requirements documents						
4	Agreed Statement of Work (SOW)						
5	0						
6	0						
WP Tasks:							
		Duration	Effort			Material	
		(Cal Weeks)	Total	ATC	IFA/PSU	Total	£k
1	Fibre Deployment & Acquisition System	0	29	0	29	0	0
2	Infrastructure Layout	0	29	29	0	0	0
3	Fore-Optics Fibre Assembly	0	36	2	34	11.04807	21.03
4	Spectrograph Assembly	0	67	67	0	0	0
5	Calibration Assembly	0	40.1	0	40.1	13.60651	25.9
6	Data Pipeline Architecture	0	59.7	30	29.7	0	0
7	Instrument Control Architecture	0	44	12	32	0	0
8	Procurement of Long Lead Components	0	6	6	0	0	0
9	Preliminary Design Review	0	0	0	0	0	0
10	PDR Phase Travel	0	0	0	0	0	0
WP Sub-Totals:			310.8	146	164.8	24.65458	46.93
Working Allowance			31	15	16	2.416601	4.6
Total Inc. Working Allowance			341.8	161	180.8	27.07118	51.53
Contingency			31	15	16	2.416601	4.6
Total inc. allowance & contingency			372.8	176	196.8	29.48779	56.13
Outputs of WP:							
1	Design review documentation as per customer SOW						
2	PDR report & minutes, including close-out of actions						
3	Customer approval to progress to detailed design phase						
4	Updated risk register						
5	Updated cost and schedule to completion						
6	0						

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.3 LEVEL 1 SUMMARY - DETAILED DESIGN (C0.00.00)

Work Package Description							
Project:		PRVS	Issue:		1		
WP Title:		DETAILED DESIGN PHASE	Date:		17-Sep-06		
WP Start Event:		PDR	WP Ref No:		C0	0	0
WP End Event:		FDR					
WP Owner:		DAVID LUNNEY	Organisation Responsible:		UK ATC		
Aims of WP:							
1	Complete instrument detailed design to FDR level						
2	Produce full manufacturing specification and drawing set to allow procurement						
3	Begin procurement of long lead items as required by schedule						
4	Update cost and schedule to completion						
5	0						
Inputs to WP:							
1	PDR documentation						
2	PDR design reports and minutes						
3	0						
4	0						
5	0						
6	0						
WP Tasks:							
		Duration	Effort			Material	
		(Cal Weeks)	Total	ATC	IFA/PSU	Total	£k
1	Fibre Deployment & Acquisition System	0	25	0	25	28.89414	0
2	Infrastructure	0	32	32	0	5.263	0
3	Fore-Optics Fibre Assembly	0	19.9	2	17.9	0	0
4	Spectrograph Assembly	0	60	60	0	439.4419	36.5
5	Calibration Assembly	0	20.4	0	20.4	0	0
6	Data Pipeline	0	30	18	12	8.4	0
7	Instrument Control System	0	36	12	24	3.677436	0
8	Procurement of Long Lead Components	0	0	0	0	0	0
9	Final Design Review	0	0	0	0	0	0
10	FDR Phase Travel	0	0	0	0	0	0
WP Sub-Totals:			223.3	124	99.3	485.6765	50.163
Working Allowance			21	12	9	53.36896	83.2
Total Inc. Working Allowance			244.3	136	108.3	539.0455	912.2
Contingency			21	12	9	53.00121	82.5
Total inc. allowance & contingency			265.3	148	117.3	592.0467	994.7
Outputs of WP:							
1	Final design review minutes						
2	Final design documentation set						
3	Close out report for actions arising from FDR						
4	FDR documentation						
5	Updated cost and schedule to completion						
6	Updated Risk Analysis						

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4 LEVEL 1 SUMMARY - SUB-SYSTEM ASSEMBLY AND AIV (D0.00.00)

Work Package Description											
Project:		PRVS		Issue:		1					
WP Title:		SUB-ASSEMBLY AIV		Date:		17-Sep-06					
WP Start Event:		FDR COMPLETE		WP Ref No:		<table border="1"> <tr> <td>D0</td> <td>0</td> <td>0</td> <td></td> </tr> </table>		D0	0	0	
D0	0	0									
WP End Event:		SUB-SYSTEMS VERIFIED									
WP Owner:		DAVID LUNNEY		Organisation Responsible:		UK ATC					

Aims of WP:	
1	Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed
2	Manufacture, Procure, Code and Assembly of sub-systems
3	Test and Performance Verification of Sub Assemblies
4	0
5	0

Inputs to WP:	
1	CDR Documentation and Reports
2	Verification Plan
3	0
4	0
5	0
6	0

WP Tasks:		Duration (Cal Weeks)	Effort			Material		
			Total	ATC	IFA/PSU	Total	£k	\$k
1	Fibre Deployment & Acquisition System	0	27	0	27	0.525348	0	1
2	Infrastructure	0	26	26	0	190	190	0
3	Fore-Optics Fibre Assembly	0	20.5	0	20.5	29.20935	0	55.6
4	Spectrograph Assembly	0	75	75	0	368.0857	163.2	390
5	Calibration Assembly	0	25.9	0	25.9	37.66745	0	71.7
6	Data Pipeline	0	14	8	6	0	0	0
7	Instrument Control System	0	30	6	24	0	0	0
8	Sub-System Phase Travel	0	0	0	0	0	0	0
9	N/R	0	0	0	0	0	0	0
10	N/R	0	0	0	0	0	0	0
WP Sub-Totals:			218.4	115	103.4	625.4879	353.2	518.3
Working Allowance			24	13	11	62.56556	35.3	51.9
Total Inc. Working Allowance			242.4	128	114.4	688.0535	388.5	570.2
Contingency			25	14	11	62.56556	35.3	51.9
Total inc. allowance & contingency			267.4	142	125.4	750.619	423.8	622.1

Outputs of WP:	
1	Fully Tested sub-systems
2	Sub-system Acceptance Review documentation
3	Full Design Documentation
4	Maintenance Manuals
5	0
6	0

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.1 Level 2 Summary - Fibre Deployment (D0.01.00)

Work Package Description			
Project:	PRVS	Issue:	1
WP Title:	Fibre Deployment & Acquisition System	Date:	17 September 2006
WP Start Event:	FDR COMPLETE	WP Ref No:	D0 1 0
WP End Event:	SUB-SYSTEM VERIFIED		
WP Owner:	David Montgomery	Organisation Responsible:	UK ATC

Aims of WP:

- 1 Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed
- 2 Manufacture, Procure, Code and Assembly of sub-systems
- 3 Test and Performance Verification of Sub Assemblies
- 4
- 5

Inputs to WP:

- 1 CDR Documentation and Reports
- 2 Verification Plan
- 3
- 4
- 5
- 6

WP Tasks:			Duration	Effort			Material		
			(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	Produce Manufacturing Drawings & hold MRR		4	4		4	0		
2	Component Manufacture/Procurement		12	2		2	0		
3	Assy & Test of Focal Reducer		2	2		2	0		
4	Assy & Test of Pick Off Assy		2	3		3	0		
5	Assy of Beam Splitter		2	2		2	0		
6	Assy & Test of Acquisition Camera		4	6		6	0		
7	Assy & Test of Filter Mechanism		4	6		6	0		
8	Test Equipment Manufacture/Procurement		12	0			0		
9	Sub-Assy I&V (Requires Flexure Test)		12	2		2	0.525348		1
10	Documentation - Manual & Test Reports		4	0			0		0
				0			0		
WP Sub-Totals:				27	0	27	0.525348	0	1
CALCULATION CHECK					0	0		0	0
Working Allowance				3		3	0.052535		0.1
Total Inc. Working Allowance				30	0	30	0.577883	0	1.1
Contingency				3		3	0.052535		0.1
Total inc. allowance & contingency				33	0	33	0.630418	0	1.2

Outputs of WP:

- 1 Fully Tested sub-systems
- 2 Sub-system Acceptance Review documentation
- 3 Full Design Documentation
- 4 Maintenance Manuals
- 5
- 6

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.2 Level 2 Summary - Infrastructure (D0.02.00)

Work Package Description		Issue:		1	
Project:	PRVS	Date:	17 September 2006		
WP Title:	Infrastructure	WP Ref No:	D0	2	0
WP Start Event:	FDR COMPLETE				
WP End Event:	SUB-SYSTEM VERIFIED				
WP Owner:	UK ATC	Organisation Responsible:	David Montgomery		

Aims of WP:	
1	Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed
2	Manufacture, Procure, Code and Assembly of sub-systems
3	Test and Performance Verification of Sub Assemblies
4	
5	

Inputs to WP:	
1	CDR Documentation and Reports
2	Verification Plan
3	
4	
5	
6	

WP Tasks:	Duration (Cal Weeks)	Effort			Material		
		Total	ATC	IFA/PSU	Total £k	£k	\$k
1 Produce Manufacturing Drawings & hold MRR	4	2	2		0		
2 Component Manufacture/Procurement	12	1	1		0		
3 Assy & Test of Electronics Cabinet	2	7	7		30	30	
4 Assy & Test of Shutter Assy	4	2	2		20	20	
5 Assy & Test of Cryostat	8	10	10		120	120	
6 Assy & Test of Handling Equipment	2	1	1		10	10	
7 Test Equipment Manufacture/Procurement	12	0			0		
8 Sub-Assy I&V	12	2	2		10	10	
9 Documentation - Manual & Test Reports	4	1	1		0		
10		0			0		
		0			0		
WP Sub-Totals:		26	26	0	190	190	0
CALCULATION CHECK			0	0		0	0
Working Allowance		3	3	0	19	19	
Total Inc. Working Allowance		29	29	0	209	209	0
Contingency		3	3	0	19	19	
Total inc. allowance & contingency		32	32	0	228	228	0

Outputs of WP:	
1	Fully Tested sub-systems
2	Sub-system Acceptance Review documentation
3	Full Design Documentation
4	Maintenance Manuals
5	
6	

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.3 Level 2 Summary - Fore-Optics Fibre Assembly (D0.03.00)

Work Package Description																																																																																																																																																													
Project:	PRVS		Issue:	1																																																																																																																																																									
WP Title:	Fore-Optics Fibre Assembly		Date:	17 September 2006																																																																																																																																																									
WP Start Event:	FDR COMPLETE		WP Ref No:	D0	3	0																																																																																																																																																							
WP End Event:	SUB-SYSTEM VERIFIED																																																																																																																																																												
WP Owner:	Larry Ramsey		Organisation Responsible:	PSU																																																																																																																																																									
Aims of WP:																																																																																																																																																													
1	Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed																																																																																																																																																												
2	Manufacture, Procure, Code and Assembly of sub-systems																																																																																																																																																												
3	Test and Performance Verification of Sub Assemblies																																																																																																																																																												
4																																																																																																																																																													
5																																																																																																																																																													
Inputs to WP:																																																																																																																																																													
1	CDR Documentation and Reports																																																																																																																																																												
2	Verification Plan																																																																																																																																																												
3																																																																																																																																																													
4																																																																																																																																																													
5																																																																																																																																																													
6																																																																																																																																																													
<table border="1"> <thead> <tr> <th rowspan="2">WP Tasks:</th> <th rowspan="2">Duration (Cal Weeks)</th> <th colspan="3">Effort</th> <th colspan="3">Material</th> </tr> <tr> <th>Total</th> <th>ATC</th> <th>IFA/PSU</th> <th>Total £k</th> <th>£k</th> <th>\$k</th> </tr> </thead> <tbody> <tr> <td>1 Produce Manufacturing Drawings & hold MRR</td> <td>4</td> <td>4</td> <td></td> <td>4</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>2 Component Manufacture/Procurement</td> <td>12</td> <td>1</td> <td></td> <td>1</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>3 Assy & Test of Input Coupler Window</td> <td>2</td> <td>1</td> <td></td> <td>1</td> <td>2.62674</td> <td></td> <td>5</td> </tr> <tr> <td>4 Test Science Fibre Cable</td> <td>4</td> <td>2</td> <td></td> <td>2</td> <td>5.516154</td> <td></td> <td>10.5</td> </tr> <tr> <td>5 Test Calibration Fibre Cable</td> <td>4</td> <td>2</td> <td></td> <td>2</td> <td>2.153927</td> <td></td> <td>4.1</td> </tr> <tr> <td>6 Assy & Test of Fibre Agitators</td> <td>4</td> <td>2</td> <td></td> <td>2</td> <td>2.62674</td> <td></td> <td>5</td> </tr> <tr> <td>7 Assy & Test of Fibre Slicer</td> <td>6</td> <td>2</td> <td></td> <td>2</td> <td>7.880221</td> <td></td> <td>15</td> </tr> <tr> <td>8 Test Equipment Manufacture/Procurement</td> <td>12</td> <td>1</td> <td></td> <td>1</td> <td>7.880221</td> <td></td> <td>15</td> </tr> <tr> <td>9 Sub-Assy I&V</td> <td>12</td> <td>4</td> <td></td> <td>4</td> <td>0.525348</td> <td></td> <td>1</td> </tr> <tr> <td>10 Documentation - Manual & Test Reports</td> <td>4</td> <td>1.5</td> <td></td> <td>1.5</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>WP Sub-Totals:</td> <td></td> <td>20.5</td> <td>0</td> <td>20.5</td> <td>29.20935</td> <td>0</td> <td>55.6</td> </tr> <tr> <td>CALCULATION CHECK</td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td>Working Allowance</td> <td></td> <td>2</td> <td>0</td> <td>2</td> <td>2.889414</td> <td></td> <td>5.5</td> </tr> <tr> <td>Total Inc. Working Allowance</td> <td></td> <td>22.5</td> <td>0</td> <td>22.5</td> <td>32.09877</td> <td>0</td> <td>61.1</td> </tr> <tr> <td>Contingency</td> <td></td> <td>2</td> <td>0</td> <td>2</td> <td>2.889414</td> <td></td> <td>5.5</td> </tr> <tr> <td>Total inc. allowance & contingency</td> <td></td> <td>24.5</td> <td>0</td> <td>24.5</td> <td>34.98818</td> <td>0</td> <td>66.6</td> </tr> </tbody> </table>								WP Tasks:	Duration (Cal Weeks)	Effort			Material			Total	ATC	IFA/PSU	Total £k	£k	\$k	1 Produce Manufacturing Drawings & hold MRR	4	4		4	0			2 Component Manufacture/Procurement	12	1		1	0			3 Assy & Test of Input Coupler Window	2	1		1	2.62674		5	4 Test Science Fibre Cable	4	2		2	5.516154		10.5	5 Test Calibration Fibre Cable	4	2		2	2.153927		4.1	6 Assy & Test of Fibre Agitators	4	2		2	2.62674		5	7 Assy & Test of Fibre Slicer	6	2		2	7.880221		15	8 Test Equipment Manufacture/Procurement	12	1		1	7.880221		15	9 Sub-Assy I&V	12	4		4	0.525348		1	10 Documentation - Manual & Test Reports	4	1.5		1.5	0					0			0			WP Sub-Totals:		20.5	0	20.5	29.20935	0	55.6	CALCULATION CHECK			0	0		0	0	Working Allowance		2	0	2	2.889414		5.5	Total Inc. Working Allowance		22.5	0	22.5	32.09877	0	61.1	Contingency		2	0	2	2.889414		5.5	Total inc. allowance & contingency		24.5	0	24.5	34.98818	0	66.6
WP Tasks:	Duration (Cal Weeks)	Effort			Material																																																																																																																																																								
		Total	ATC	IFA/PSU	Total £k	£k	\$k																																																																																																																																																						
1 Produce Manufacturing Drawings & hold MRR	4	4		4	0																																																																																																																																																								
2 Component Manufacture/Procurement	12	1		1	0																																																																																																																																																								
3 Assy & Test of Input Coupler Window	2	1		1	2.62674		5																																																																																																																																																						
4 Test Science Fibre Cable	4	2		2	5.516154		10.5																																																																																																																																																						
5 Test Calibration Fibre Cable	4	2		2	2.153927		4.1																																																																																																																																																						
6 Assy & Test of Fibre Agitators	4	2		2	2.62674		5																																																																																																																																																						
7 Assy & Test of Fibre Slicer	6	2		2	7.880221		15																																																																																																																																																						
8 Test Equipment Manufacture/Procurement	12	1		1	7.880221		15																																																																																																																																																						
9 Sub-Assy I&V	12	4		4	0.525348		1																																																																																																																																																						
10 Documentation - Manual & Test Reports	4	1.5		1.5	0																																																																																																																																																								
		0			0																																																																																																																																																								
WP Sub-Totals:		20.5	0	20.5	29.20935	0	55.6																																																																																																																																																						
CALCULATION CHECK			0	0		0	0																																																																																																																																																						
Working Allowance		2	0	2	2.889414		5.5																																																																																																																																																						
Total Inc. Working Allowance		22.5	0	22.5	32.09877	0	61.1																																																																																																																																																						
Contingency		2	0	2	2.889414		5.5																																																																																																																																																						
Total inc. allowance & contingency		24.5	0	24.5	34.98818	0	66.6																																																																																																																																																						
Outputs of WP:																																																																																																																																																													
1	Fully Tested sub-systems																																																																																																																																																												
2	Sub-system Acceptance Review documentation																																																																																																																																																												
3	Full Design Documentation																																																																																																																																																												
4	Maintenance Manuals																																																																																																																																																												
5																																																																																																																																																													
6																																																																																																																																																													

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.4 Level 2 Summary - Spectrograph Assembly (D0.04.00)

Work Package Description		Issue:	1	
Project:	PRVS	Date:	17 September 2006	
WP Title:	Spectrograph Assembly	WP Ref No:	D0	4 0
WP Start Event:	FDR COMPLETE			
WP End Event:	SUB-SYSTEM VERIFIED			
WP Owner:	David Henry	Organisation Responsible:	UK ATC	

Aims of WP:

- 1 Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed
- 2 Manufacture, Procure, Code and Assembly of sub-systems
- 3 Test and Performance Verification of Sub Assemblies
- 4
- 5

Inputs to WP:

- 1 FDR Documentation and Reports
- 2 Verification Plan
- 3
- 4
- 5
- 6

WP Tasks:		Duration	Effort			Material		
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	Produce Manufacturing Drawings & hold MRR	4	6	6		0		
2	Component Manufacture/Procurement	12	4	4		0		
3	Assy & Test of Detector System	12	16	16		29	29	
4	Mount Grating & complete alignment checks	4	2	2		131.337		250
5	Mount Collimator & complete alignment checks	4	2	2	0	73.6	73.6	
6	Mount Cross Disperser & complete alignment checks	8	2	2		73.54873		140
7	Build & Test of Camera Assy	12	10	10	0	47.4	47.4	
8	Optical Bench Assy	4	3	3		13.2	13.2	
9	Test Equipment Manufacture/Procurement	12	6	6		0		
10	Sub-Assy I&V (Includes Documentation)	12	24	24		0		
			0			0		
WP Sub-Totals:			75	75	0	368.0857	163.2	390
CALCULATION CHECK				0	0		0	0
Working Allowance			8	8		36.78857	16.3	39
Total Inc. Working Allowance			83	83	0	404.8743	179.5	429
Contingency			8	8		36.78857	16.3	39
Total inc. allowance & contingency			91	91	0	441.6629	195.8	468

Outputs of WP:

- 1 Fully Tested sub-systems
- 2 Sub-system Acceptance Review documentation
- 3 Full Design Documentation
- 4 Maintenance Manuals
- 5
- 6

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.5 Level 2 Summary - Calibration Assembly (D0.05.00)

Work Package Description		Issue:	1	
Project:	PRVS	Date:	17 September 2006	
WP Title:	Calibration Assembly	WP Ref No:	D0	5
WP Start Event:	FDR COMPLETE			0
WP End Event:	SUB-SYSTEM VERIFIED			
WP Owner:	Bill Dent	Organisation Responsible:	UK ATC	

Aims of WP:

- 1 Produce full manufacturing specification and drawing set to allow procurement & manufacture to proceed
- 2 Manufacture, Procure, Code and Assembly of sub-systems
- 3 Test and Performance Verification of Sub Assemblies
- 4
- 5

Inputs to WP:

- 1 FDR Documentation and Reports
- 2 Verification Plan
- 3
- 4
- 5
- 6

WP Tasks:		Duration	Effort			Material		
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	Produce Manufacturing Drawings & hold MRR	4	2		2	0		
2	Component Manufacture/Procurement	12	2		2	0		
3	Assy & Test of Flat Field Unit	4	4		4	5.25348		10
4	Test Pier Lab Fibre	2	1		1	2.62674		5
5	Test Equipment Manufacture/Procurement	12	2		2	2.62674		5
6	Build Calibration Assembly	8	6		6	26.63515		50.7
7	Sub-Assy I&V	12	6.9		6.9	0.525348		1
8	Documentation - Manual & Test Reports	4	2		2	0		
9			0			0		
10			0			0		
			0			0		
WP Sub-Totals:			25.9	0	25.9	37.66745	0	71.7
CALCULATION CHECK				0	0		0	0
Working Allowance			3	0	3	3.835041		7.3
Total Inc. Working Allowance			28.9	0	28.9	41.5025	0	79
Contingency			4	1	3	3.835041		7.3
Total inc. allowance & contingency			32.9	1	31.9	45.33754	0	86.3

Outputs of WP:

- 1 Fully Tested sub-systems
- 2 Sub-system Acceptance Review documentation
- 3 Full Design Documentation
- 4 Maintenance Manuals
- 5
- 6

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.6 Level 2 Summary – (Data Pipeline D0.06.00)

Work Package Description																																																																																																																																																													
Project:		PRVS		Issue:	1																																																																																																																																																								
WP Title:		Data Pipeline		Date:	17 September 2006																																																																																																																																																								
WP Start Event:		FDR COMPLETE		WP Ref No:	D0	6	0																																																																																																																																																						
WP End Event:		SUB-SYSTEM VERIFIED																																																																																																																																																											
WP Owner:		Andy Vick / Larry Ramsey		Organisation Responsible:	UK ATC / PSU																																																																																																																																																								
Aims of WP:																																																																																																																																																													
1	Test and Performance Verification of Software																																																																																																																																																												
2																																																																																																																																																													
3																																																																																																																																																													
4																																																																																																																																																													
5																																																																																																																																																													
Inputs to WP:																																																																																																																																																													
1	FDR Documentation and Reports																																																																																																																																																												
2	Verification Plan																																																																																																																																																												
3																																																																																																																																																													
4																																																																																																																																																													
5																																																																																																																																																													
6																																																																																																																																																													
<table border="1"> <thead> <tr> <th rowspan="2">WP Tasks:</th> <th rowspan="2">Duration (Cal Weeks)</th> <th colspan="3">Effort</th> <th colspan="3">Material</th> </tr> <tr> <th>Total</th> <th>ATC</th> <th>IFA/PSU</th> <th>Total £k</th> <th>£k</th> <th>\$k</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Test & debug OLDP software</td> <td>24</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> <td></td> </tr> <tr> <td>2</td> <td>Test & debug Data Handler software</td> <td>24</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> <td></td> </tr> <tr> <td>3</td> <td>Test & debug Gemini DHS software</td> <td>24</td> <td>4</td> <td>2</td> <td>2</td> <td>0</td> <td></td> </tr> <tr> <td>4</td> <td>Documentation - Manual & Test Reports</td> <td>4</td> <td>4</td> <td>2</td> <td>2</td> <td>0</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td></td> </tr> <tr> <td colspan="2">WP Sub-Totals:</td> <td>14</td> <td>8</td> <td>6</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="2">CALCULATION CHECK</td> <td></td> <td>0</td> <td>0</td> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="2">Working Allowance</td> <td>2</td> <td>1</td> <td>1</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Total Inc. Working Allowance</td> <td>16</td> <td>9</td> <td>7</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="2">Contingency</td> <td>2</td> <td>1</td> <td>1</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td colspan="2">Total inc. allowance & contingency</td> <td>18</td> <td>10</td> <td>8</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>								WP Tasks:	Duration (Cal Weeks)	Effort			Material			Total	ATC	IFA/PSU	Total £k	£k	\$k	1	Test & debug OLDP software	24	3	2	1	0		2	Test & debug Data Handler software	24	3	2	1	0		3	Test & debug Gemini DHS software	24	4	2	2	0		4	Documentation - Manual & Test Reports	4	4	2	2	0		5			0			0		6			0			0		7			0			0		8			0			0		9			0			0		10			0			0					0			0		WP Sub-Totals:		14	8	6	0	0	0	CALCULATION CHECK			0	0		0	0	Working Allowance		2	1	1	0			Total Inc. Working Allowance		16	9	7	0	0	0	Contingency		2	1	1	0			Total inc. allowance & contingency		18	10	8	0	0	0
WP Tasks:	Duration (Cal Weeks)	Effort			Material																																																																																																																																																								
		Total	ATC	IFA/PSU	Total £k	£k	\$k																																																																																																																																																						
1	Test & debug OLDP software	24	3	2	1	0																																																																																																																																																							
2	Test & debug Data Handler software	24	3	2	1	0																																																																																																																																																							
3	Test & debug Gemini DHS software	24	4	2	2	0																																																																																																																																																							
4	Documentation - Manual & Test Reports	4	4	2	2	0																																																																																																																																																							
5			0			0																																																																																																																																																							
6			0			0																																																																																																																																																							
7			0			0																																																																																																																																																							
8			0			0																																																																																																																																																							
9			0			0																																																																																																																																																							
10			0			0																																																																																																																																																							
			0			0																																																																																																																																																							
WP Sub-Totals:		14	8	6	0	0	0																																																																																																																																																						
CALCULATION CHECK			0	0		0	0																																																																																																																																																						
Working Allowance		2	1	1	0																																																																																																																																																								
Total Inc. Working Allowance		16	9	7	0	0	0																																																																																																																																																						
Contingency		2	1	1	0																																																																																																																																																								
Total inc. allowance & contingency		18	10	8	0	0	0																																																																																																																																																						
Outputs of WP:																																																																																																																																																													
1	Tested software																																																																																																																																																												
2	Full Design Documentation																																																																																																																																																												
3	Software User Manuals																																																																																																																																																												
4																																																																																																																																																													
5																																																																																																																																																													
6																																																																																																																																																													

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.4.7 Level 2 Summary - Instrument Control System (D0.07.00)

Work Package Description		Issue:		1	
Project:	PRVS	Date:	17 September 2006		
WP Title:	Instrument Control System	WP Ref No:	D0	7	0
WP Start Event:	FDR COMPLETE				
WP End Event:	SUB-SYSTEM VERIFIED				
WP Owner:	John Rayner	Organisation Responsible:	IFA		

Aims of WP:	
1	Test and Performance Verification of Software
2	
3	
4	
5	

Inputs to WP:	
1	FDR Documentation and Reports
2	Verification Plan
3	
4	
5	
6	

WP Tasks:	Duration (Cal Weeks)	Effort			Material		
		Total	ATC	IFA/PSU	Total £k	£k	\$k
1 Test & debug Vac & Temp Monitoring software	24	3	1	2	0		
2 Test & debug Sequencer software	24	4		4	0		
3 Test & debug Acquisition & Guider Control software	24	6	2	4	0		
4 Test & debug Mechanism software	24	5	1	4	0		
5 Test & debug User I/F software	24	2		2	0		
6 Test & debug Camera & Detector Control software	24	4	2	2	0		
7 Test Equipment Manufacture/Procurement	12	2		2	0		
8 Documentation - Manual & Test Reports	4	4		4	0		
9		0			0		
10		0			0		
		0			0		
WP Sub-Totals:		30	6	24	0	0	0
CALCULATION CHECK			0	0		0	0
Working Allowance		3	1	2	0		
Total Inc. Working Allowance		33	7	26	0	0	0
Contingency		3	1	2	0		
Total inc. allowance & contingency		36	8	28	0	0	0

Outputs of WP:	
1	Tested software
2	Full Design Documentation
3	Software User Manuals
4	
5	
6	

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.5 LEVEL 1 SUMMARY - INSTRUMENT INTEGRATION & VERIFICATION (E0.00.00)

Work Package Description							
Project:		PRVS		Issue:		1	
WP Title:		INTEGRATION & VERIFICATION		Date:		17-Sep-06	
WP Start Event:		SUB-SYSTEM I&V COMPLETE		WP Ref No:		E0	0
WP End Event:		ACCEPTANCE TEST REPORT ISSUED				0	
WP Owner:		PHIL REES		Organisation Responsible:		UK ATC	
Aims of WP:							
1	Assembly of Full Instrument						
2	Verification against Functional Requirements						
3	Verification against Performance Requirements						
4	Customer Acceptance Test						
5	0						
Inputs to WP:							
1	Fully Tested and verified Sub-Systems						
2	System Verification Plan						
3	Acceptance Plan						
4	0						
5	0						
6	0						
WP Tasks:							
		Duration	Effort			Material	
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k
1	Instrument Assembly	8	26	22	4	0	0
2	Thermal Tests	8	28	24	4	0	0
3	Detector Intergration	8	54	50	4	0	0
4	Functuional Tests	4	26	14	12	0	0
5	Performance Tests	8	33	25	8	0	0
6	Acceptance Tests	2	14.8	10	4.8	0	0
7	Produce Acceptance Tests Reports	2	10	6	4	0	0
8	Produce Design, User and Maintenance Manuals	10	10	8	2	0	0
9	Acceptance Test Review	1	6	6	0	0	0
10	I&V Phase Travel	0	0	0	0	0	0
WP Sub-Totals:			207.8	165	42.8	0	0
Working Allowance			20	16	4	0	0
Total inc. Working Allowance			227.8	181	46.8	0	0
Contingency			30	24	6	0	0
Total inc. allowance & contingency			257.8	205	52.8	0	0
Outputs of WP:							
1	Fully Operational System						
2	Acceptance Test report						
3	Final System Budgets						
4	Final Versions of Design, User and Maintenance Manuals						
5	0						
6	0						

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.6 LEVEL 1 SUMMARY - COMMISSIONING (F0.00.00)

Work Package Description			
Project:	PRVS	Issue:	1
WP Title:	COMMISSIONING	Date:	17-Sep-06
WP Start Event:	AT REPORT APPROVED BY GEMINI	WP Ref No:	F0 0 0 0
WP End Event:	ON-SKY VERIFICATION COMPLETE		
WP Owner:	DAVID LUNNEY	Organisation Responsible:	UK ATC

Aims of WP:	
1	Deliver complete Instrument and associated manuals, spares etc to Telescope site
2	Re-Assy of Instrument and confirm interfaces to Gemini (Physical and Software)
3	Confirm Functional performance of Instrument and telescope
4	0
5	0

Inputs to WP:	
1	Instrument completed Acceptance Test
2	Commissioning Plan
3	All required deliverable documentation completed
4	0
5	0
6	0

WP Tasks:		Duration	Effort			Material		
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	Pack and Ship	4	20	20	0	0	0	0
2	Re Assemble Instrument in Gemini Lab and Verify	2	16	16	0	0	0	0
3	Fit to Telescope, Integrate software	3	22	20	2	0	0	0
4	On-Sky test & Verification	4	38	24	14	0	0	0
5	Final Acceptance	1	14	10	4	0	0	0
6	Return of non-deliverable equipment used at Gemini	1	2	2	0	0	0	0
7	Commissioning Travel	0	0	0	0	98.9	98.9	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
WP Sub-Totals:			112	92	20	98.9	98.9	0
Working Allowance			11	9	2	15.25348	10	10
Total Inc. Working Allowance			123	101	22	114.1535	108.9	10
Contingency			11	9	2	12.62674	10	5
Total inc. allowance & contingency			134	110	24	126.7802	118.9	15

Outputs of WP:	
1	All Telescope Interfaces confirmed as satisfactory
2	Instrument is Ready for Science Verification Commissioning
3	0
4	0
5	0
6	0

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.7 LEVEL 1 SUMMARY - SYSTEMS ENGINEERING (SE.00.00)

Work Package Description				
Project:	PRVS	Issue:	1	
WP Title:	SYSTEMS ENGINEERING	Date:	17-Sep-06	
WP Start Event:	KICK OFF MEETING	WP Ref No:	SE	0 0 0
WP End Event:	COMPLETION OF ON-SKY VERIFICATION			
WP Owner:	PHIL REES	Organisation Responsible:	UK ATC	

Aims of WP:	
1	Define and maintain the development specification of the Instrument, including compliance with Gemini Interfaces
2	Agree a system architecture and decompose the system level requirements to subsystem ICDs and sub system requirements specificatio
3	Develop, maintain budgets which allocate key performance parameters to sub-systems, including feedback of design data and test results
4	Agree a verification plan for subsystem and full system AIV and oversee the correct completion of those processes
5	Agree an Acceptance Test Plan and engineering commissioning Plan with customer and lead completion of both including reports.

Inputs to WP:	
1	Design Study Documentation
2	Statement of work from customer
3	GEMINI ICDs
4	Science Case
5	0
6	0

WP Tasks:		Duration	Effort			Material		
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	PRODUCT DEVELOPMENT SPECIFICATION	60	8	8	0	0	0	0
2	INTERFACE CONTROL DEFINITION AND MANAGEME	60	10	10	0	0	0	0
3	SYSTEM MODELLING, ANALYSIS AND CONTROL	148	20	20	0	0	0	0
4	INTERGRATION AND VERIFICATION PLANNING	32	10	10	0	0	0	0
5	SUB_SYSTEM VERIFICATION MANAGEMENT	46	8	8	0	0	0	0
6	SYSTEM INTEGRATION AND VERIFICATION MANAGI	24	8	8	0	0	0	0
7	SYSTEM LEVEL MANUALS	4	4	4	0	0	0	0
8	CONFIGURATION MANAGEMENT	148	4	4	0	0	0	0
9	PRODUCT ASSURANCE	148	4	4	0	0	0	0
10	0	0	0	0	0	0	0	0
WP Sub-Totals:			76	76	0	0	0	0
Working Allowance			7	7	0	0	0	0
Total Inc. Working Allowance			83	83	0	0	0	0
Contingency			7	7	0	0	0	0
Total inc. allowance & contingency			90	90	0	0	0	0

Outputs of WP:	
1	System description documents including Product Development Specification, System Engineering Plan, System architecture.
2	Subsystem ICDs and Requirements documents
3	Record of allocation of Instrument performance Budgets and actual result data
4	Subsystem and system level verification records
5	Acceptance Test plan and results, Engineering commissioning plan and results
6	Systems Engineering Reviews and reports

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.8 LEVEL 1 SUMMARY - SCIENCE (SC.00.00)

Work Package Description			
Project:	PRVS	Issue:	1
WP Title:	SCIENCE	Date:	17-Sep-06
WP Start Event:	KICK OFF MEETING	WP Ref No:	SC 0 0
WP End Event:	COMPLETION OF ON-SKY VERIFICATION		
WP Owner:	HUGH JONES	Organisation Responsible:	UoH

Aims of WP:	
1	Review the Science Case and translate to top level engineering requirements
2	Create and maintain models of the Instrument performance to understand engineering trades as required
3	Assist Customer in planning for science performance verification, science commissioning and implementation
4	Provide initial science user guide
5	0

Inputs to WP:	
1	Science Case
2	Reports and documents from equivalent instruments world-wide
3	Science Requirements
4	Initial OCDD from Design Study
5	0
6	0

WP Tasks:		Duration	Effort			Material		
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k
1	Translate Science case to engineering Requirements	36	12	8	4	0	0	0
2	Instrument Models	134	24	16	8	51.52088	20	60
3	Oversight of system design and verification	134	20	14	6	0	0	0
4	V&C Planning	94	16	12	4	0	0	0
5	Sub-system verification	46	22	12	10	0	0	0
6	System Verification	26	24	16	8	0	0	0
7	Manage & Lead Science Team	148	8	8	0	0	0	0
8	Science Travel Budget	N/A	0	0	0	10	10	0
9	Science Workshops	134	10	8	2	20	20	0
10	0	0	0	0	0	0	0	0
WP Sub-Totals:			136	94	42	81.52088	50	60
Working Allowance			13	9	4	8.152088	5	6
Total Inc. Working Allowance			149	103	46	89.67297	55	66
Contingency			13	9	4	8.152088	5	6
Total inc. allowance & contingency			162	112	50	97.82506	60	72

Outputs of WP:	
1	Science Case and OCDD
2	Instrument Models
3	Verification and Science Implementation plans
4	User's Guide
5	0
6	0

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

3.9 LEVEL 1 SUMMARY - PROJECT MANAGEMENT (PM.00.00)

Work Package Description																																																																																																																																																																
Project:		PRVS		Issue:		1																																																																																																																																																										
WP Title:		PROJECT MANAGEMENT		Date:		17-Sep-06																																																																																																																																																										
WP Start Event:		Kick-off Meeting		WP Ref No:		PM	0 0																																																																																																																																																									
WP End Event:		Project Close-out																																																																																																																																																														
WP Owner:		DAVID LUNNEY		Organisation Responsible:		UK ATC																																																																																																																																																										
Aims of WP:																																																																																																																																																																
1	To ensure the project is completed to schedule, cost and specification (as per agreed Contract)																																																																																																																																																															
2	To provide the oversight required to ensure clear communications between all project stakeholders i.e. PSU, IFA UoH, UK ATC (& PPARC																																																																																																																																																															
3	To report to all project stakeholders on project status & major issues																																																																																																																																																															
4	0																																																																																																																																																															
5	0																																																																																																																																																															
Inputs to WP:																																																																																																																																																																
1	Design Study document which includes initial schedule, cost and specification																																																																																																																																																															
2	Signed Contract																																																																																																																																																															
3	0																																																																																																																																																															
4	0																																																																																																																																																															
5	0																																																																																																																																																															
6	0																																																																																																																																																															
<table border="1"> <thead> <tr> <th colspan="2">WP Tasks:</th> <th>Duration</th> <th colspan="3">Effort</th> <th colspan="3">Material</th> </tr> <tr> <th></th> <th></th> <th>(Cal Weeks)</th> <th>Total</th> <th>ATC</th> <th>IFA/PSU</th> <th>Total £k</th> <th>£k</th> <th>\$k</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CONSORTIUM MANAGEMENT</td> <td>148</td> <td>39</td> <td>39</td> <td>0</td> <td>4.5</td> <td>4.5</td> <td>0</td> </tr> <tr> <td>2</td> <td>STAKEHOLDER LIAISON</td> <td>148</td> <td>15</td> <td>15</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>3</td> <td>UK ATC WP MANAGEMENT</td> <td>148</td> <td>79</td> <td>79</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>4</td> <td>IFA WP MANAGEMENT</td> <td>148</td> <td>11</td> <td>0</td> <td>11</td> <td>15.76044</td> <td>0</td> <td>30</td> </tr> <tr> <td>5</td> <td>PSU WP MANAGEMENT</td> <td>148</td> <td>6.8</td> <td>0</td> <td>6.8</td> <td>15.76044</td> <td>0</td> <td>30</td> </tr> <tr> <td>6</td> <td>PROCUREMENT</td> <td>110</td> <td>27</td> <td>27</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>7</td> <td>DOCUMENT CONTROL</td> <td>110</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>8</td> <td>TRAVEL</td> <td>135</td> <td>0</td> <td>0</td> <td>0</td> <td>46</td> <td>46</td> <td>0</td> </tr> <tr> <td>9</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>10</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="2">WP Sub-Totals:</td> <td></td> <td>177.8</td> <td>160</td> <td>17.8</td> <td>82.02088</td> <td>50.5</td> <td>60</td> </tr> <tr> <td colspan="2">Working Allowance</td> <td></td> <td>18</td> <td>16</td> <td>2</td> <td>6.576044</td> <td>5</td> <td>3</td> </tr> <tr> <td colspan="2">Total Inc. Working Allowance</td> <td></td> <td>195.8</td> <td>176</td> <td>19.8</td> <td>88.59693</td> <td>55.5</td> <td>63</td> </tr> <tr> <td colspan="2">Contingency</td> <td></td> <td>18</td> <td>16</td> <td>2</td> <td>6.576044</td> <td>5</td> <td>3</td> </tr> <tr> <td colspan="2">Total inc. allowance & contingency</td> <td></td> <td>213.8</td> <td>192</td> <td>21.8</td> <td>95.17297</td> <td>60.5</td> <td>66</td> </tr> </tbody> </table>								WP Tasks:		Duration	Effort			Material					(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k	1	CONSORTIUM MANAGEMENT	148	39	39	0	4.5	4.5	0	2	STAKEHOLDER LIAISON	148	15	15	0	0	0	0	3	UK ATC WP MANAGEMENT	148	79	79	0	0	0	0	4	IFA WP MANAGEMENT	148	11	0	11	15.76044	0	30	5	PSU WP MANAGEMENT	148	6.8	0	6.8	15.76044	0	30	6	PROCUREMENT	110	27	27	0	0	0	0	7	DOCUMENT CONTROL	110	0	0	0	0	0	0	8	TRAVEL	135	0	0	0	46	46	0	9	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	WP Sub-Totals:			177.8	160	17.8	82.02088	50.5	60	Working Allowance			18	16	2	6.576044	5	3	Total Inc. Working Allowance			195.8	176	19.8	88.59693	55.5	63	Contingency			18	16	2	6.576044	5	3	Total inc. allowance & contingency			213.8	192	21.8	95.17297	60.5	66
WP Tasks:		Duration	Effort			Material																																																																																																																																																										
		(Cal Weeks)	Total	ATC	IFA/PSU	Total £k	£k	\$k																																																																																																																																																								
1	CONSORTIUM MANAGEMENT	148	39	39	0	4.5	4.5	0																																																																																																																																																								
2	STAKEHOLDER LIAISON	148	15	15	0	0	0	0																																																																																																																																																								
3	UK ATC WP MANAGEMENT	148	79	79	0	0	0	0																																																																																																																																																								
4	IFA WP MANAGEMENT	148	11	0	11	15.76044	0	30																																																																																																																																																								
5	PSU WP MANAGEMENT	148	6.8	0	6.8	15.76044	0	30																																																																																																																																																								
6	PROCUREMENT	110	27	27	0	0	0	0																																																																																																																																																								
7	DOCUMENT CONTROL	110	0	0	0	0	0	0																																																																																																																																																								
8	TRAVEL	135	0	0	0	46	46	0																																																																																																																																																								
9	0	0	0	0	0	0	0	0																																																																																																																																																								
10	0	0	0	0	0	0	0	0																																																																																																																																																								
WP Sub-Totals:			177.8	160	17.8	82.02088	50.5	60																																																																																																																																																								
Working Allowance			18	16	2	6.576044	5	3																																																																																																																																																								
Total Inc. Working Allowance			195.8	176	19.8	88.59693	55.5	63																																																																																																																																																								
Contingency			18	16	2	6.576044	5	3																																																																																																																																																								
Total inc. allowance & contingency			213.8	192	21.8	95.17297	60.5	66																																																																																																																																																								
Outputs of WP:																																																																																																																																																																
1	Create and Maintain Management Plan, Risk Management Plan, Health & Safety Plan, Documentation Management Plan																																																																																																																																																															
2	Progress Reports as required by different stakeholders i.e. PSU, PPARC, UK ATC, UoH & IFA																																																																																																																																																															
3	Project Plan (updated as required/agreed)																																																																																																																																																															
4	Project Budget (updated as required/agreed)																																																																																																																																																															
5	Project Close-out report																																																																																																																																																															
6	0																																																																																																																																																															

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

4. LEVEL 1 EFFORT PROFILES

PRVS Exchange Rate \$= 0.525 £

Task: WP Ref No:

INSTRUMENT	0	0	0
------------	---	---	---

	EVENTS PHASE	PDR					CDR					FDR					Assembly					I&T					AT		Pack	COMM											
		B										C										D					E										F				
Effort UK ATC / UoH		1st Year												2nd Year												3rd Year															
	TOTAL	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36				
Optical Engineer	106	3	3	3	6	5	5	3	4	4	3	2	4	2	4	4	0	0	1	1	2	1	5	4	4	3	3	3	4	4	4	2	4	4	2	0	0				
Mechanical Engineer	110	4	4	4	4	4	4	4	3	4	5	6	6	8	8	8	8	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	0	0			
Mechanical Draughtsman	45	2	2	2	2	2	1	1	2	2	2	2	0	0	2	2	2	2	2	1	0	0	1	0	0	1	0	0	1	0	1	4	3	2	1	0	0				
Workshop / Technician	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	6	6	4	1	1	4	1	1	4	1	1	1	4	1	4	4	4	4	0	0				
Software Engineer	134	5	5	5	5	3	3	4	6	6	6	6	4	4	4	6	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	0	2	4	2	0	0			
Electronic Engineer	87	2	2	2	2	2	2	2	0	0	2	2	2	2	2	2	4	4	4	6	6	4	2	2	2	3	4	4	4	2	2	0	4	4	0	0	0				
Electronic Technician	39	0	1	0	0	1	0	0	0	0	0	1	3	2	2	2	4	4	8	0	0	0	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0				
Electronic Wiring	39	0	0	0	0	0	0	1	0	0	0	0	2	2	0	0	6	6	6	0	0	0	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0				
Project Manager	124	4	4	4	3	4	3	3	3	4	3	3	3	4	4	4	3	3	4	3	3	4	4	3	3	3	3	3	4	4	4	0	8	8	4	0	0				
Project Assistant	44	1	1	1	1	2	1	1	1	3	1	1	1	1	1	3	1	1	1	1	1	2	1	1	1	1	1	1	1	2	3	2	1	1	1	0	0				
Project Scientist / PI	54	3	2	1	1	3	1	1	2	2	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	3	4	0	0			
Instrument Scientist	56	3	2	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	1	2	1	2	1	2	1	2	1	2	1	2	3	3	0	4	4	0	0				
Systems Engineer	76	4	3	2	1	1	1	1	2	4	3	2	2	2	2	2	4	2	2	2	2	2	3	4	3	4	2	1	1	4	2	1	1	1	1	0	0				
Total ATC	977	31	29	25	26	28	22	21	25	32	28	27	31	30	32	39	38	34	40	26	22	22	30	26	26	29	24	25	30	27	34	22	32	38	26	0	0				

	EVENTS PHASE	PDR												CDR												FDR												Assembly												I&T												AT												Pack												COMM											
		B												C												D												E												F																																															
Effort PSU / IFA		1st Year												2nd Year												3rd Year																																																																							
	TOTAL	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36																																																												
Optical Engineer	26.6	1	2	2	1	1	1	1	2	2	1	1	0	1	1	2	1.2	1.2	1.2	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0																																																												
Mechanical Engineer	118	5	5	5	5	5	5	5	6	6	7	7	7	7	6	6	5	5	5	4	4	2	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0																																																												
Mechanical Draughtsman	28.5	1	1	1	1	1	3	3	3	3	1	0	1	1.5	1.5	3.5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																												
Workshop / Technician	37	0	1	2	2	1	1	0	0	0	0	0	0	0	0	0	9	10	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																												
Software Engineer	159	7	7	6	6	6	6	7	8	8	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	2	2	2	2	2	4	0	2	4	0	0																																																													
Electronic Engineer	14	2	1	1	0	1	1	1	1	0	0	1	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																												
Electronic Technician	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																												
Electronic Wiring	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																																																												
Project Manager	17.8	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0.2	1.2	0.2	0	0																																																												
Project Assistant	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	0	0	0	0	0	0	0																																																												
Project Scientist / PI	22.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0	0	0	0	0																																																												
Instrument Scientist	52	4	1	1	1	1	1	1	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	2	3	5	0																																																												
Systems Engineer	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	0	0	0	0	0	0	0																																																												
Total IFA/PSU	490.1	21.4	19.4	20.4	18.4	17.4	20.4	19.4	22.4	24.4	17	17	19	18.5	16.5	22.5	26	31	35	9.6	9.6	9.6	7.6	7.6	7.6	3.6	3.6	4.6	3.6	3.6	9.6	3.2	5.2	9.2	6.2	0	0																																																												

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006

MATERIALS	TOTAL	1st Year												2nd Year												3rd Year											
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
ATC / UoH (£)	602.76	15	1	0	0.5	10	15	0	0.5	1	1	5	2.5	22	39.66	12.5	40.5	71	110	94.2	25	21.5	0	5	1.5	0	0	6	0.5	1	1	15	49.4	15	20.5	0	0
PSU / IFA (\$)	1514.23	0	0	0	0	0	8	25	12	57.93	2	5	8	74	13	766.6	175	305	15.7	15	0	11	0	0	1	0	0	0	10	0	10	0	0	0	0	0	0
Total Materials	1398.26	15.00	1.00	0.00	0.50	10.00	19.20	13.13	6.80	31.43	2.05	7.63	6.70	60.88	46.49	415.23	132.44	231.23	118.25	102.08	25.00	27.28	0.00	5.00	2.03	0.00	0.00	6.00	5.75	1.00	6.25	15.00	49.40	15.00	20.50	0.00	0.00

PRECISION RADIAL VELOCITY SPECTROMETER

Document Number:	PRVS-BDG-00001-0001
Issue:	1.0
Category:	Management
Status:	Issued
Author:	David Lunney
Date:	18 th September 2006