Southern African Large Telescope
SALTICAM
Preliminary Design Review

Document Number 3300AE0009:
Schedule

Geoff Evans
Dave Carter
Willie Koorts
James O'Connor
Darragh O'Donoghue
Faranah Osman
Stan van der Merwe

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1 Introduction

Fig. 1 shows the schedule for SALTICAM. The more detail there is in a schedule the more confidence it engenders and so effort has been invested in breaking down the tasks into as much detail as possible. It is therefore appropriate to explain the break down of the chart so as to make the task of understanding it easier for the reader:

- Qtr II of 2001 was the specification phase where the specification was drawn up.
- Qtr III 2001 to mid-February 2002 is the Preliminary Design Phase (numbered 5-37) culminating in the Preliminary Design Review (PDR) in the extreme left hand column.
- Items 38-46 represent long-lead time purchases. These are dominated by the CCD purchase and the optics.
- Item 47 marks the beginning of Final Design and the Verification Instrument (VI) and Acquisition Camera/Science Imager (ACSI) have been separated. This is because the VI is to be delivered first. In addition, mechanical aspects of the VI Final Design (to be discussed below) are on the VI critical path so they are separated as items 49 (VI Structure) and 59 (Cryostat). Other items (VI Electronics Design (74); SDSU Controller Setup (79) and Software (83)) are much less time critical. This phase culminates in the VI Final Design Review (90).
- ACSI Final Design begins at item 92 and runs through to ACSI Final Design Review (111).
- VI Manufacture runs from item 112 to 186 and this is followed by VI testing (187-192) with delivery at 193 on 17 February 2003.
- ACSI Manufacture runs from 195 to 201 with assembly and testing from 202 to 211. ACSI delivery on 29 July 2003 and commissioning conclude the chart.

2 VI Critical Path

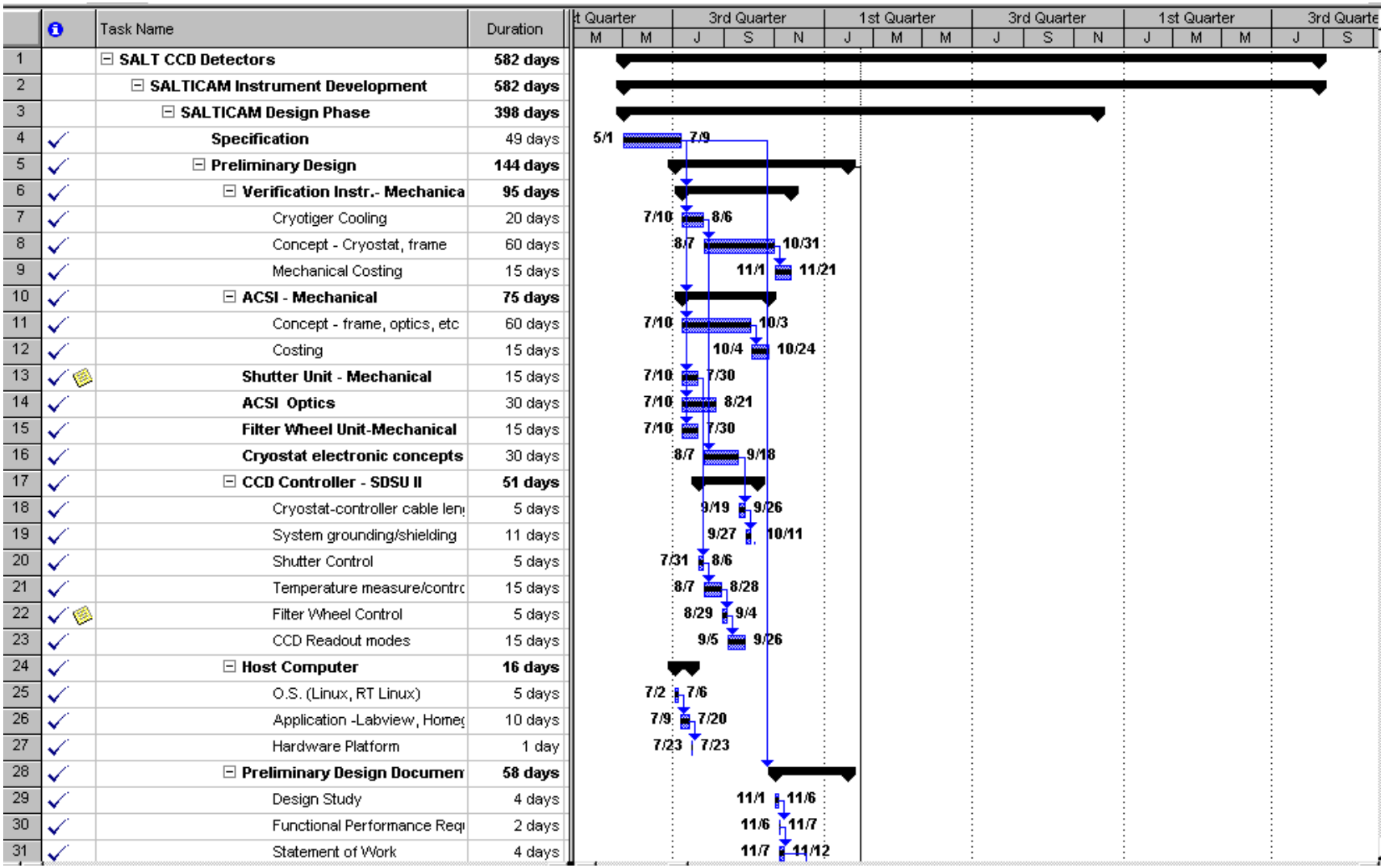
Because the VI delivery is of such significance, a great deal of attention in constructing this schedule was devoted to optimizing this event. Fig. 2 shows the VI schedule with the critical path indicated by hatching in each task bar.

It is appropriate to focus attention on item 60, the first critical path item after the PDR. Items 60-62 refer to Final Design of the cryostat continuing on to drawings and Final Design Review (FDR) preparation (71-72). **A vital aspect of the schedule is the Cryostat Mechanical FDR at the end of this period, thus allowing the Cryostat manufacture to begin at item 129.** Likewise, there is a VI structure FDR at the end of its manufacture (73). These mini-reviews are essential ahead of the VI FDR (111) in order to meet schedule.

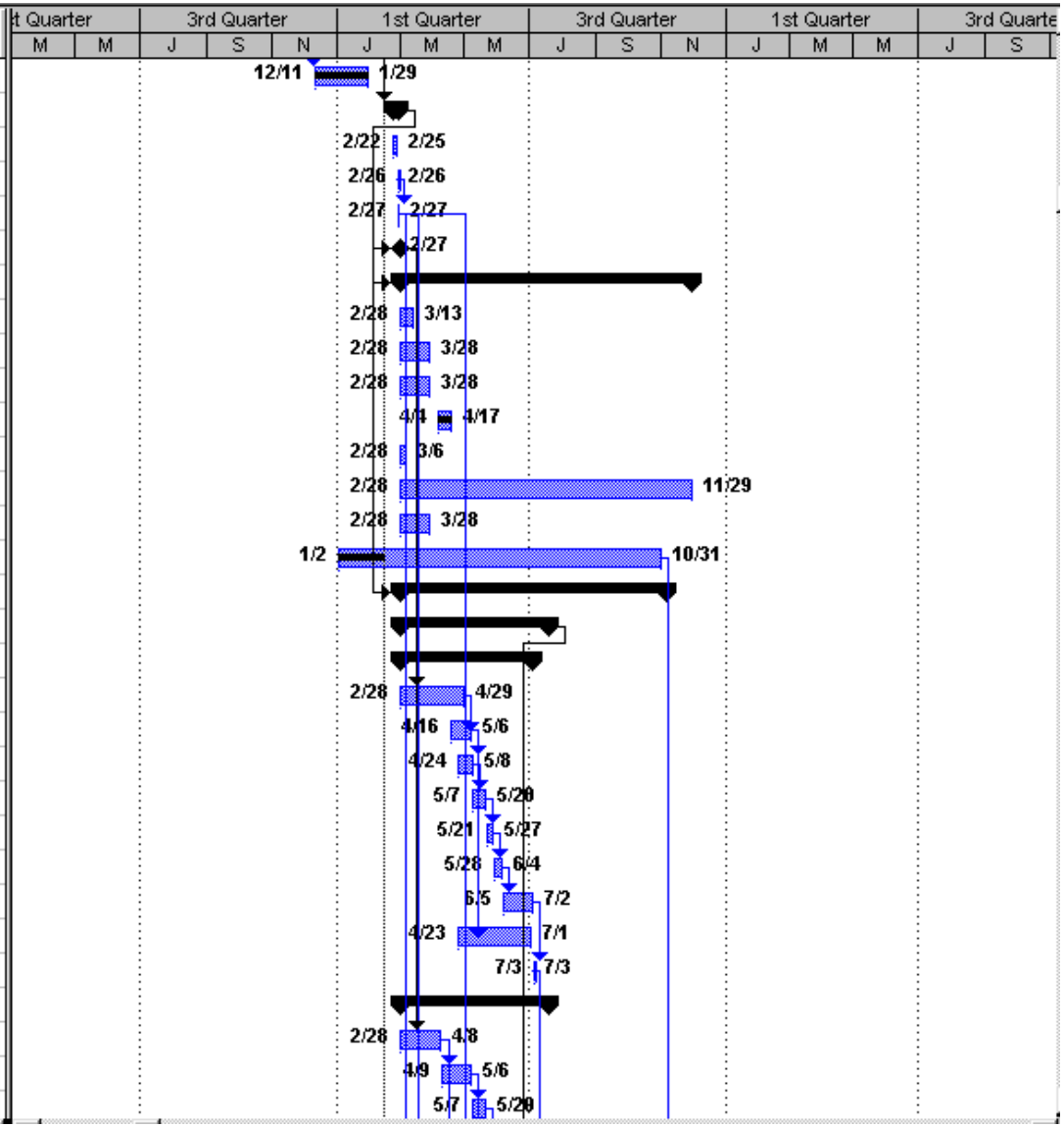
The critical path continues with cryostat manufacture (129). The cryostat is an item requiring close interaction between electronics and mechanical and that is reflected in the four phases shown (items 128-181). The manufacturing of the VI structure (items 183-5) requires a similar length of time and is, at the moment, not as finely delineated for manufacturing purposes.

With delivery on 17 February 2003, the schedule contingency is only 11 days. We recognize this as an area of risk. At the time of writing a further refinement of the schedule for the mechanical design and manufacturing tasks is in progress and will be reported on at the PDR.

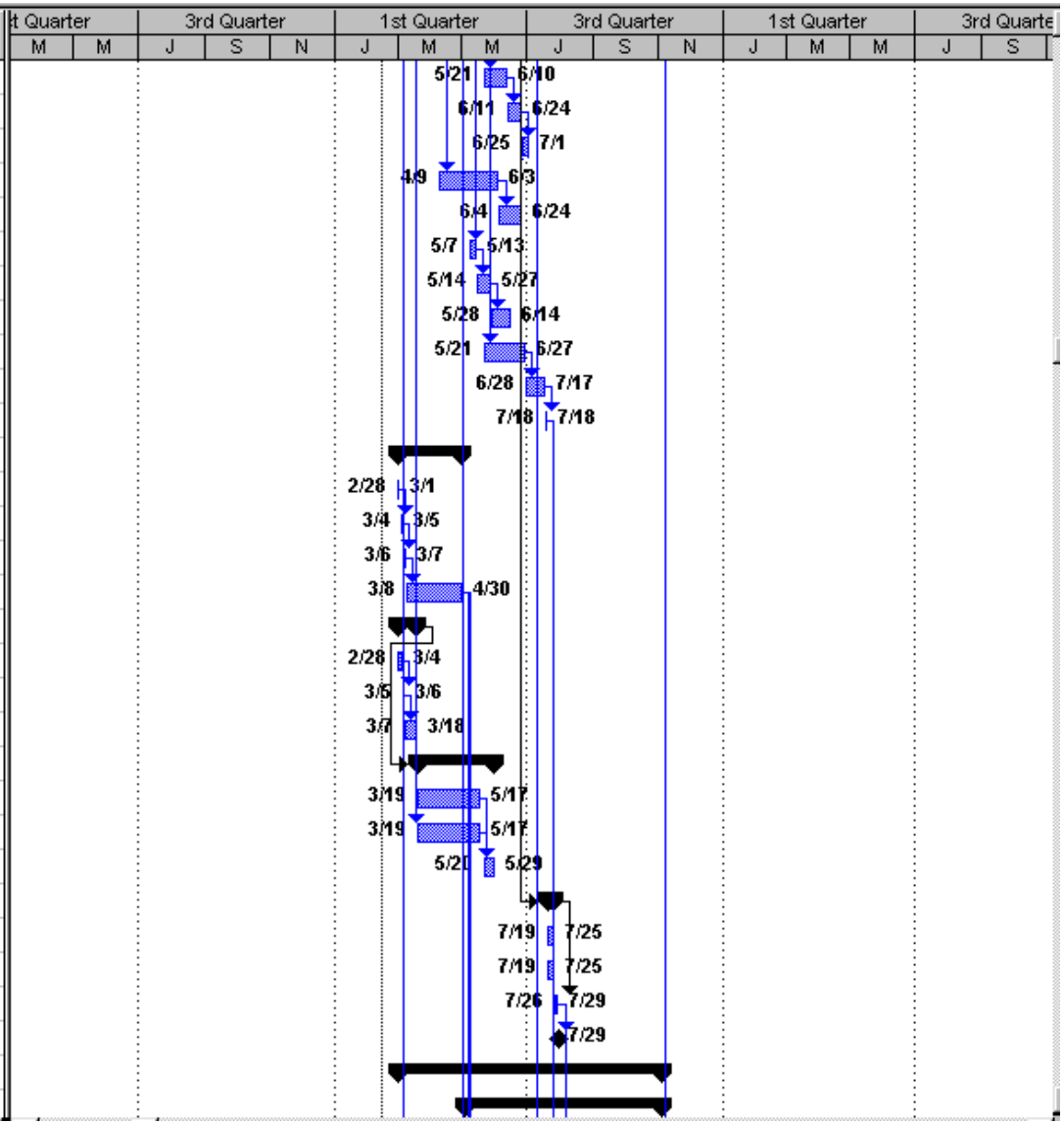
Figure 1 - SALTICAM Schedule



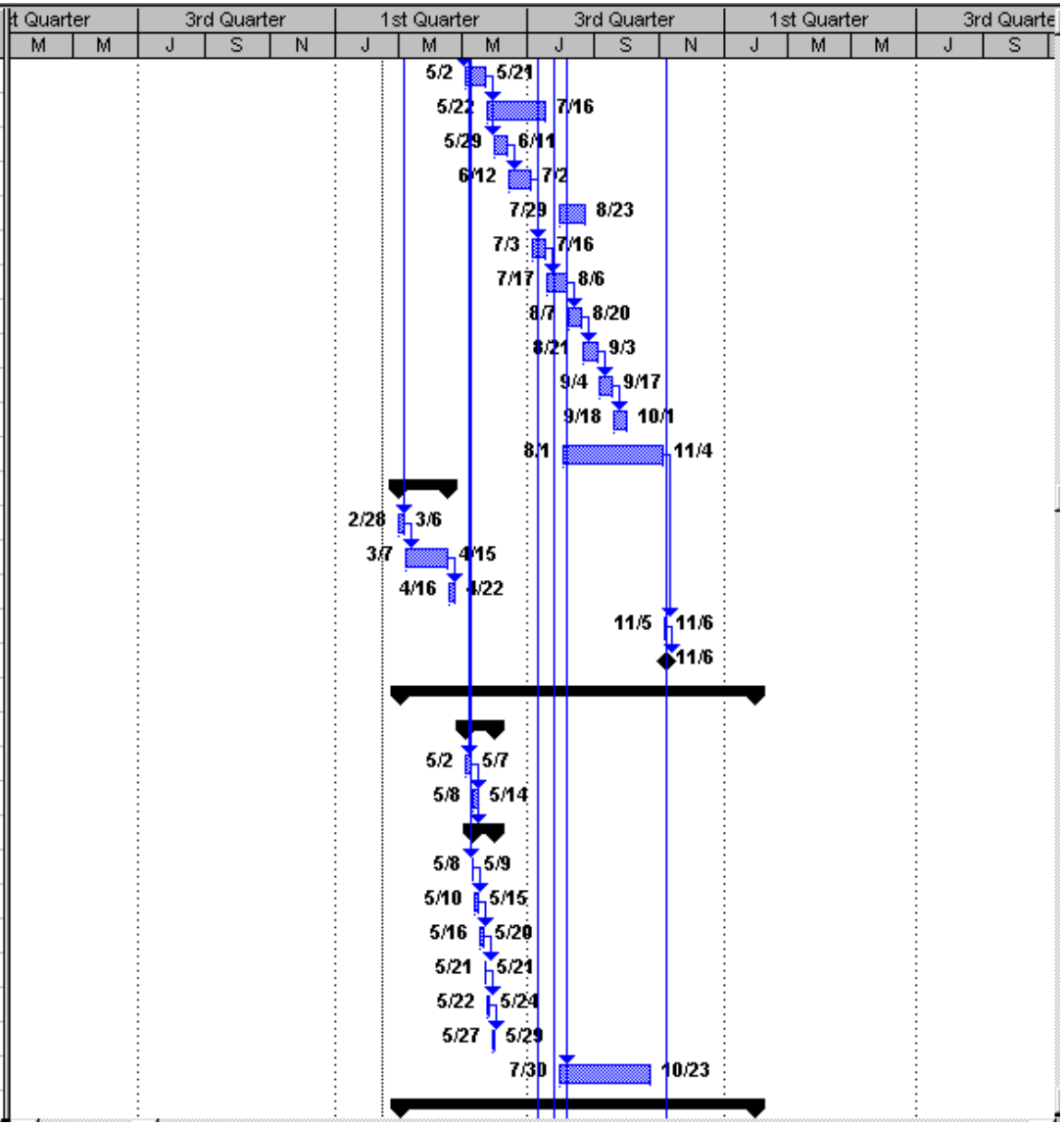
	Task Name	Duration
32	PDR Document Pack	30 days
33	**Preliminary Design Review**	**4 days**
34	PDR Preparations	2 days
35	PDR Meeting	1 day
36	Consult P. MacQueen	1 day
37	**PRELIMINARY DESIGN REVIEW CON**	0 days
38	**Long Lead Time Purchases**	**190 days**
39	Cryostat window	10 days
40	Cryocooler	20 days
41	SDSU II Controller	20 days
42	Shutter unit	10 days
43	Filters	5 days
44	Optical parts - lenses, fold mirror	190 days
45	Test equipment components	20 days
46	**CCD Long Lead Time Purchase**	210 days
47	**Final Designs**	**173 days**
48	**Verification Instrument Desig**	**96 days**
49	**VI Structure**	**85 days**
50	Concept Refinement and	40 days
51	Adjustable Mounting Sys	14 days
52	XY Indexing	10 days
53	Filter Assembly	10 days
54	Shutter and Baffles	5 days
55	Covers	6 days
56	FDR Preparations	19 days
57	Drawings	50 days
58	VI Structure FDR	1 day
59	**Cryostat**	**96 days**
60	Concept Refinement	25 days
61	Structural Design and A	19 days
62	Body and Dummy Front	10 days



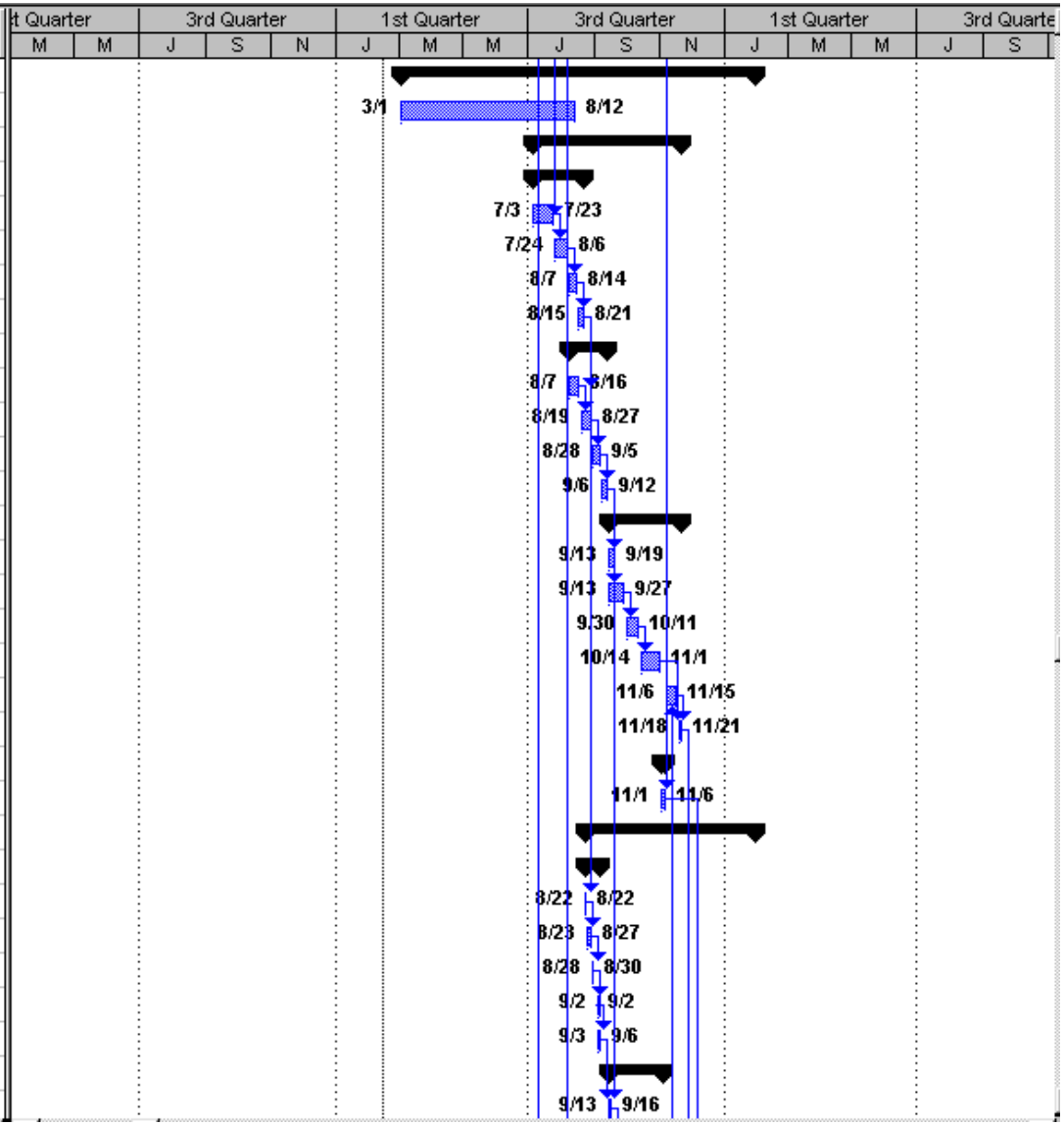
	Task Name	Duration
63	Detector Assembly	15 days
64	Vacuum Components	9 days
65	Heat Shields	5 days
66	Thermal Design and Ana	39 days
67	Cold Paths and Compon	14 days
68	Front Plate	5 days
69	Frame Transfer mask	10 days
70	Frame Transfer Drive	14 days
71	Drawings	28 days
72	FDR Preparations	14 days
73	Cryostat Mechanical FDI	1 day
74	**VI Electronics Design**	**41 days**
75	Rework PDR design	2 days
76	Rework manpower requ	2 days
77	Rework budget	2 days
78	Schematics	35 days
79	**SDSU Controller Setup**	**13 days**
80	Check DAC clock board	3 days
81	Check video board settir	2 days
82	Waveform Table Definiti	8 days
83	**SALTICAM Software**	**48 days**
84	DSP Software, write code	40 days
85	Host computer Software des	40 days
86	Software integration	8 days
87	**VI Final Design Documentatio**	**5 days**
88	Electronics Documentation	5 days
89	Software Documentation	5 days
90	**VI Final Design Review**	2 days
91	**VI FINAL DESIGN REVIEW COMI**	0 days
92	**ACSI Design**	**171 days**
93	**ACSI Mechanical Design**	**130 days**



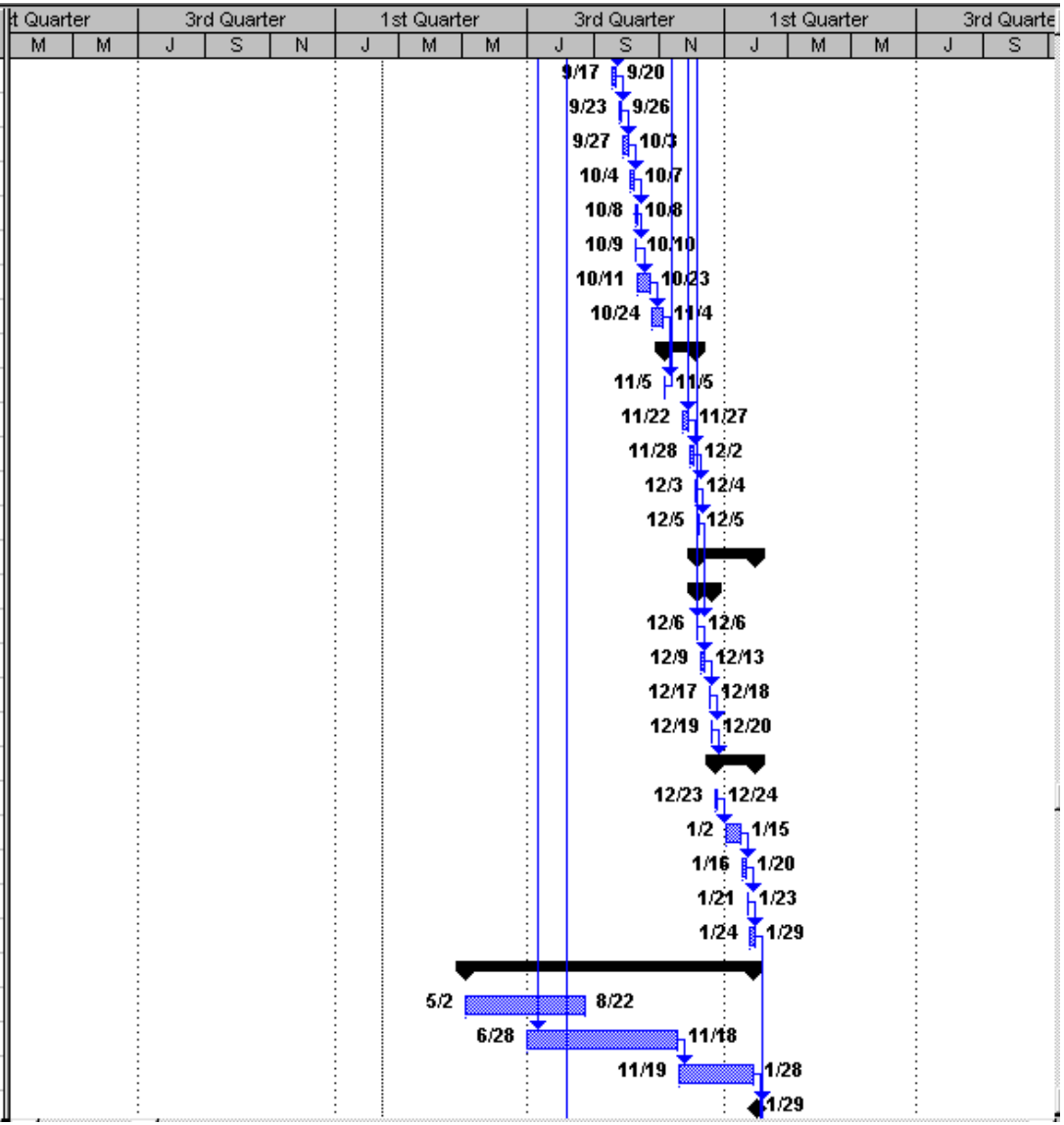
	Task Name	Duration
94	Concept Refinement	14 days
95	Structural Design and A	39 days
96	Front Barrel	10 days
97	Rear Barrel and Focus	14 days
98	Autoguider	19 days
99	Shutter/Filter Manipulato	10 days
100	Main Frame	15 days
101	Base Frame	9 days
102	Filter Cartridge	10 days
103	Covers	10 days
104	Handling Equipment	9 days
105	Drawings	66 days
106	**ACSI Electronics**	**30 days**
107	Rework PDR Design	5 days
108	Schematics	25 days
109	ACSI Final Design Document	5 days
110	**ACSI Final Design Review**	2 days
111	**ACSI FINAL DESIGN REVIEW C(**	0 days
112	**Verification Instrument Manufacture**	**225 days**
113	**Electronic Tasks**	**20 days**
114	Check on schematics	4 days
115	Crate grounding/shielding	5 days
116	**Manufacture cables and test**	**16 days**
117	Shutter cable	2 days
118	Cryostat to controller wiring	4 days
119	Cryostat Internal Wiring	3 days
120	Shorting Interface	1 day
121	Filter unit wiring	3 days
122	Electrical Connection Check	3 days
123	**Software Development - Host Coı**	**60 days**
124	**Mechanical Tasks**	**225 days**

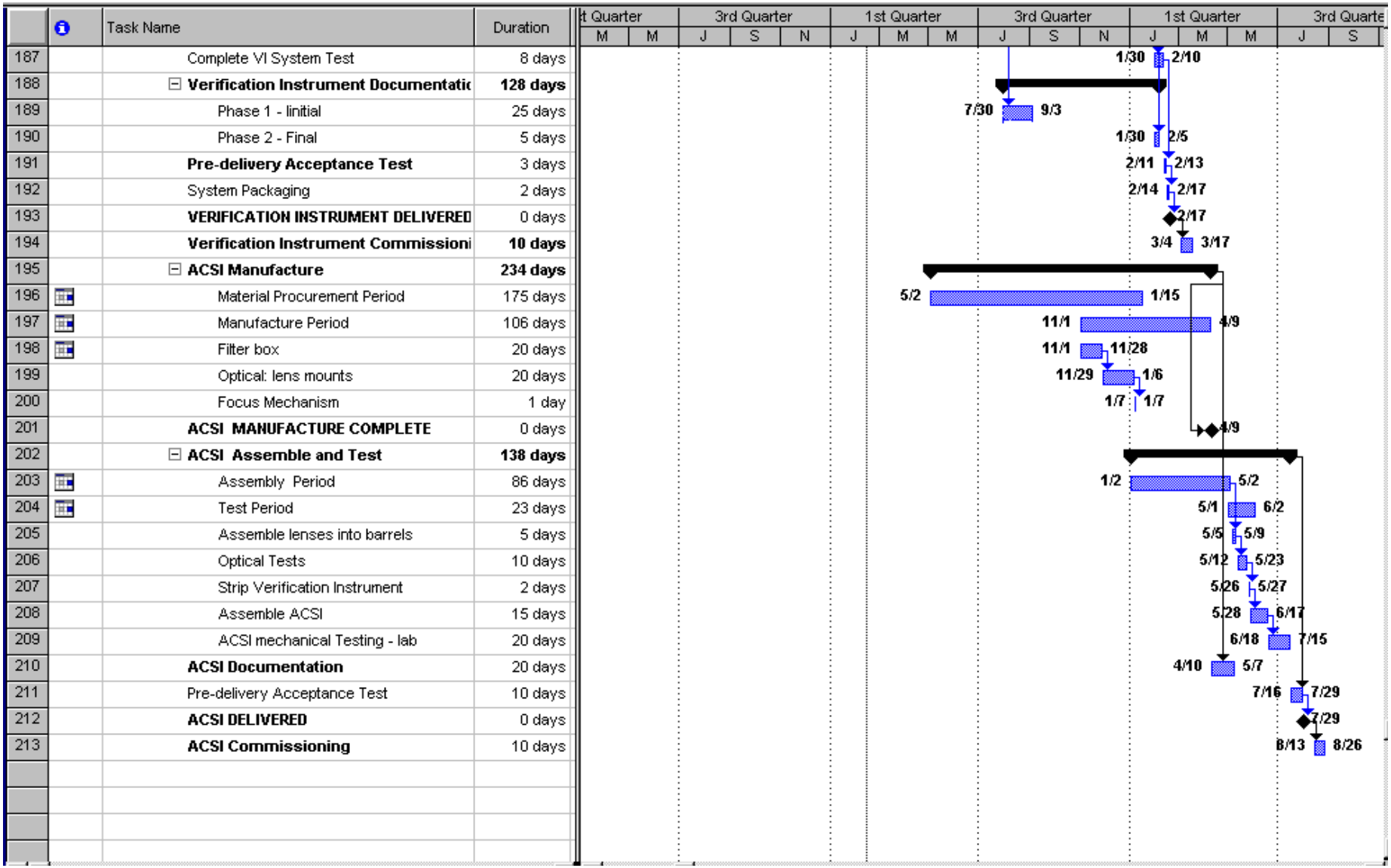


		Task Name	Duration
125		**Cryostat**	**225 days**
126		Material Procurement	111 days
127		**Manufacture**	**100 days**
128		**For Phase 1**	**35 days**
129		Cryostat body	15 days
130		Dummy Cryostat lid	10 days
131		Blanks for plugging	5 days
132		Cryotiger mounting	5 days
133		**For Phase 2**	**26 days**
134		Dummy Cold Plate a	7 days
135		Cold Path	7 days
136		Heat Shields (unpla	7 days
137		Shorting Mechanism	5 days
138		**For Phase 3**	**49 days**
139		Zeolite Containers	5 days
140		Cold plate	10 days
141		Real Cryostat Lid	10 days
142		Frame Transfer Me	15 days
143		Electropolish and G	8 days
144		Assembly and test	4 days
145		**For Phase 4**	**4 days**
146		Mosaiced CCD cold	4 days
147		**Assembly-cryogenic, vac**	**107 days**
148		**Phase 1 - Vacuum Int**	**12 days**
149		Parts delivered to E	1 day
150		Dirty Assembly/che	3 days
151		Strip & rough clean	3 days
152		Assemble and test	1 day
153		Fix vacuum problem	4 days
154		**Phase 2 - Eng CCD te**	**36 days**
155		Strip cryosat	2 days



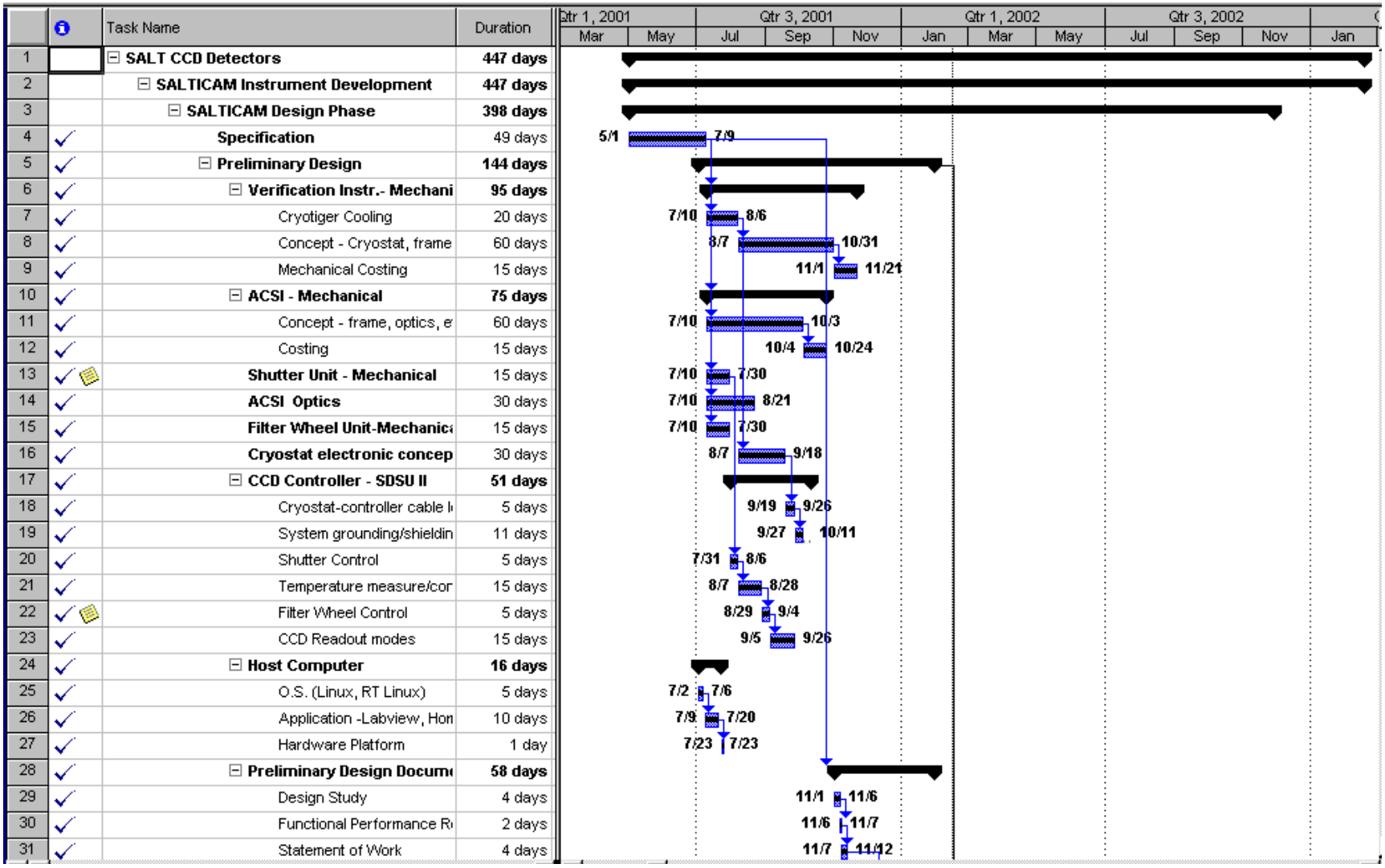
	Task Name	Duration
156	Clean and Bake	4 days
157	Glue cold parts	3 days
158	Assemble cryostat	5 days
159	Electrical Tests	2 days
160	Insert Engineering (	1 day
161	Cryotiger Tests	2 days
162	Temperature tests	9 days
163	System Tests	8 days
164	**Phase 3 - Preparation**	**23 days**
165	Disassemble, parts	1 day
166	Wash and bake	4 days
167	Final Assembly of F	3 days
168	Vacuum Integrity Te	2 days
169	Check frame transf	1 day
170	**Phase 4 - System inte**	**32 days**
171	**Cryostat Tasks**	**10 days**
172	Insert real CCD	1 day
173	Temperature te	5 days
174	Dynamic range	2 days
175	Baseline noise.	2 days
176	**Device optimizati**	**22 days**
177	Full well	2 days
178	Noise/gain	10 days
179	CTE	3 days
180	readout modes	3 days
181	Q.E. Tests	4 days
182	**VI structure**	**184 days**
183	VI Structure Material Procure	79 days
184	VI Structure Manufacture	100 days
185	Assemble	44 days
186	**VI MANUFACTURE COMPLETE**	0 days



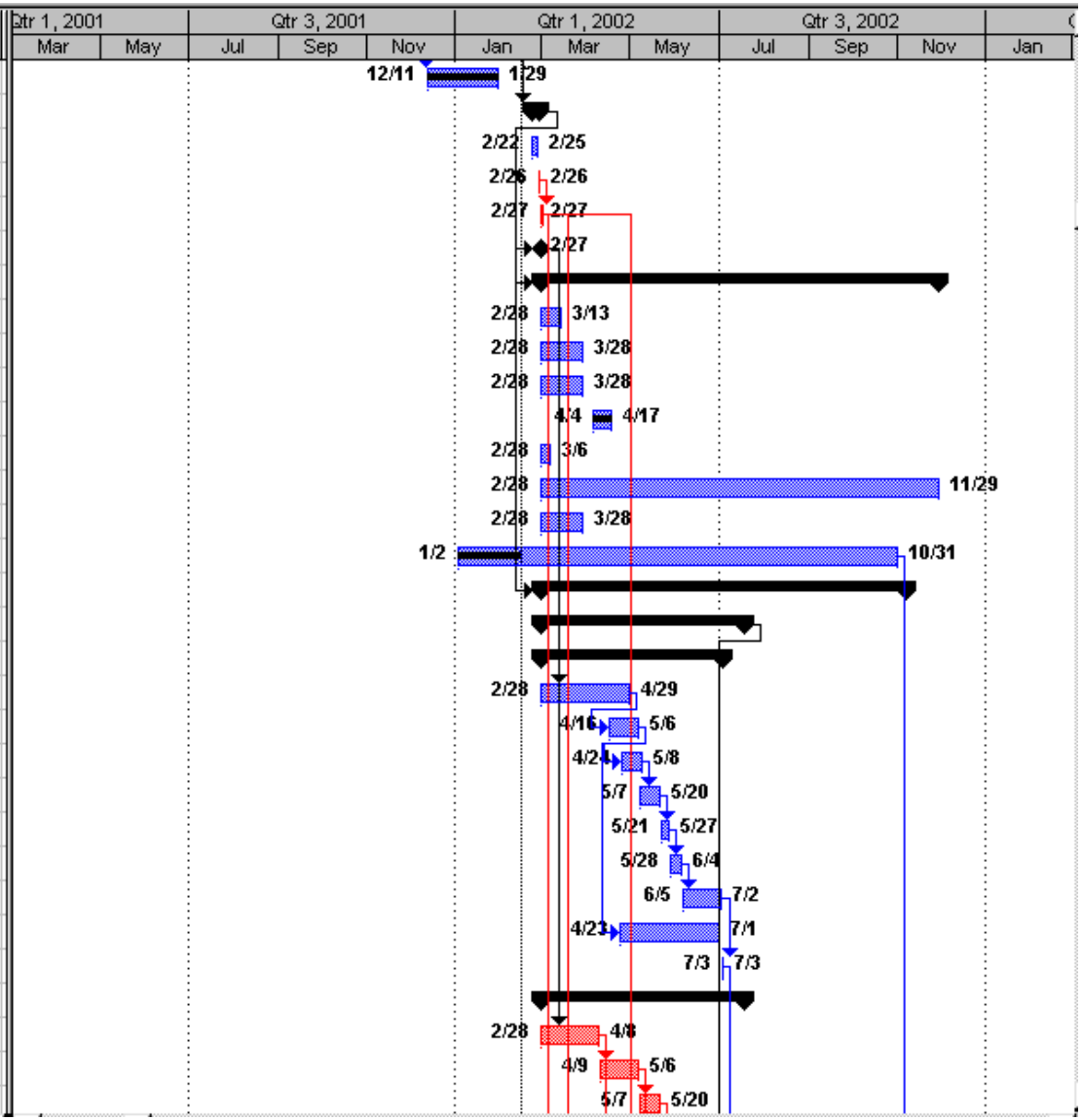


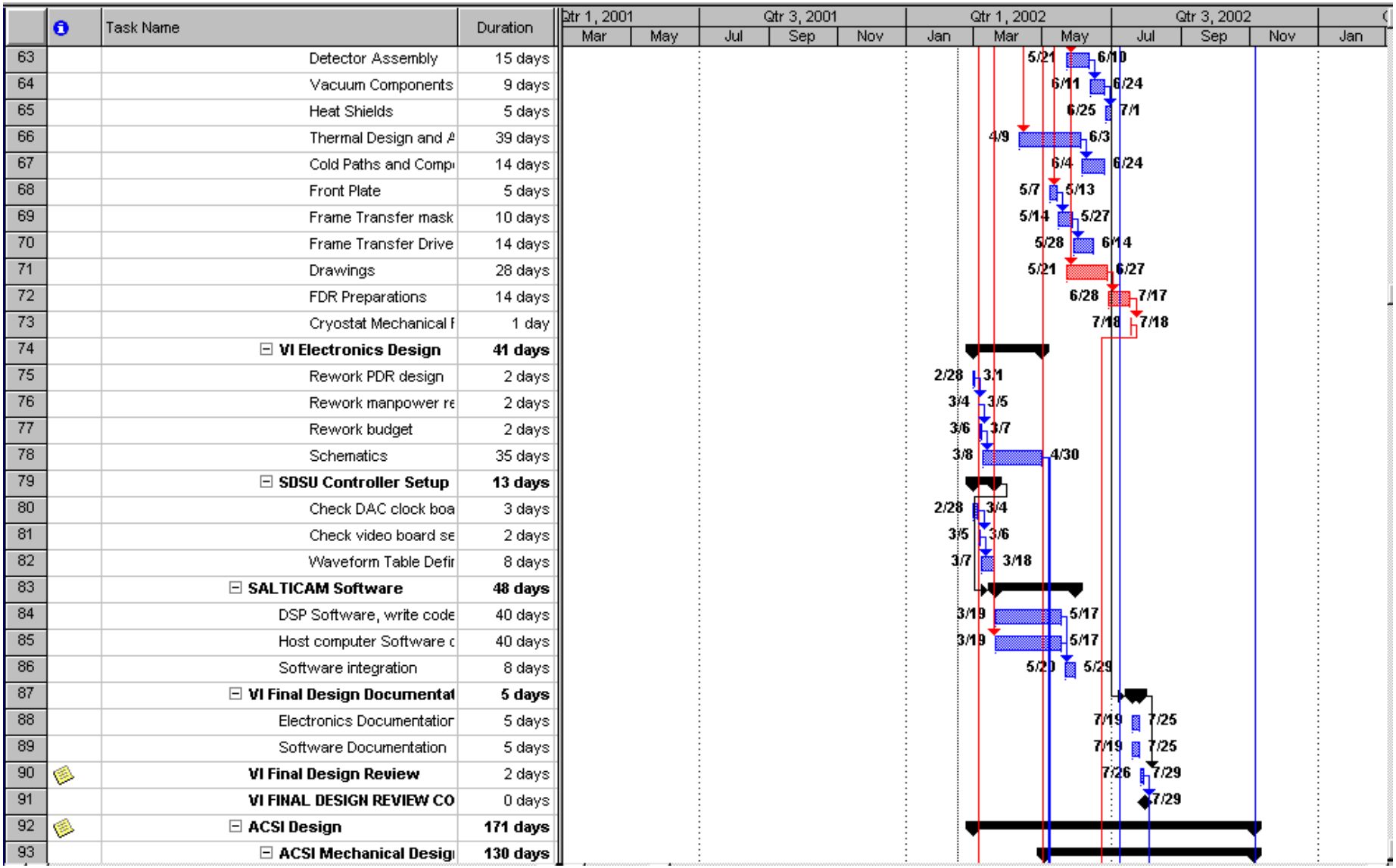
	Task Name	Duration
187	Complete VI System Test	8 days
188	**Verification Instrument Documentatic**	**128 days**
189	Phase 1 - linitial	25 days
190	Phase 2 - Final	5 days
191	**Pre-delivery Acceptance Test**	3 days
192	System Packaging	2 days
193	**VERIFICATION INSTRUMENT DELIVERED**	0 days
194	**Verification Instrument Commissioni**	**10 days**
195	**ACSI Manufacture**	**234 days**
196	Material Procurement Period	175 days
197	Manufacture Period	106 days
198	Filter box	20 days
199	Optical: lens mounts	20 days
200	Focus Mechanism	1 day
201	**ACSI MANUFACTURE COMPLETE**	0 days
202	**ACSI Assemble and Test**	**138 days**
203	Assembly Period	86 days
204	Test Period	23 days
205	Assemble lenses into barrels	5 days
206	Optical Tests	10 days
207	Strip Verification Instrument	2 days
208	Assemble ACSI	15 days
209	ACSI mechanical Testing - lab	20 days
210	**ACSI Documentation**	20 days
211	Pre-delivery Acceptance Test	10 days
212	**ACSI DELIVERED**	0 days
213	**ACSI Commissioning**	10 days

Figure 2 - SALTICAM Verification Instrument Schedule

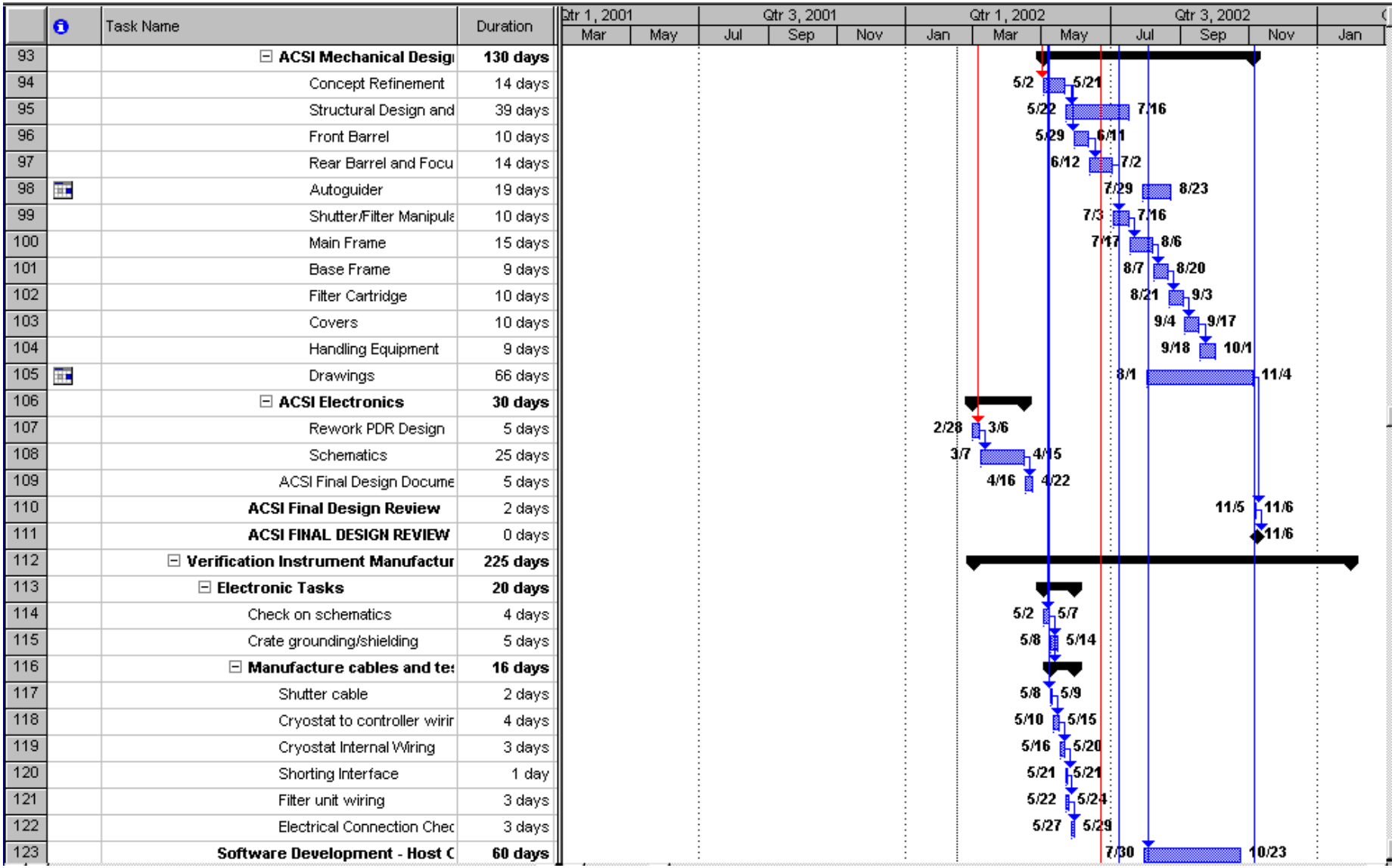


	Task Name	Duration
32	PDR Document Pack	30 days
33	**Preliminary Design Review**	**4 days**
34	PDR Preparations	2 days
35	PDR Meeting	1 day
36	Consult P. MacQueen	1 day
37	**PRELIMINARY DESIGN REVIEW C**	0 days
38	**Long Lead Time Purchases**	**190 days**
39	Cryostat window	10 days
40	Cryocooler	20 days
41	SDSU II Controller	20 days
42	Shutter unit	10 days
43	Filters	5 days
44	Optical parts - lenses, fold mirr	190 days
45	Test equipment components	20 days
46	**CCD Long Lead Time Purchase**	210 days
47	**Final Designs**	**173 days**
48	**Verification Instrument De**	**96 days**
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52	XY Indexing	10 days
53	Filter Assembly	10 days
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55	Covers	6 days
56	FDR Preparations	19 days
57	Drawings	50 days
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59	**Cryostat**	**96 days**
60	Concept Refinement	25 days
61	Structural Design and	19 days
62	Body and Dummy Fro	10 days

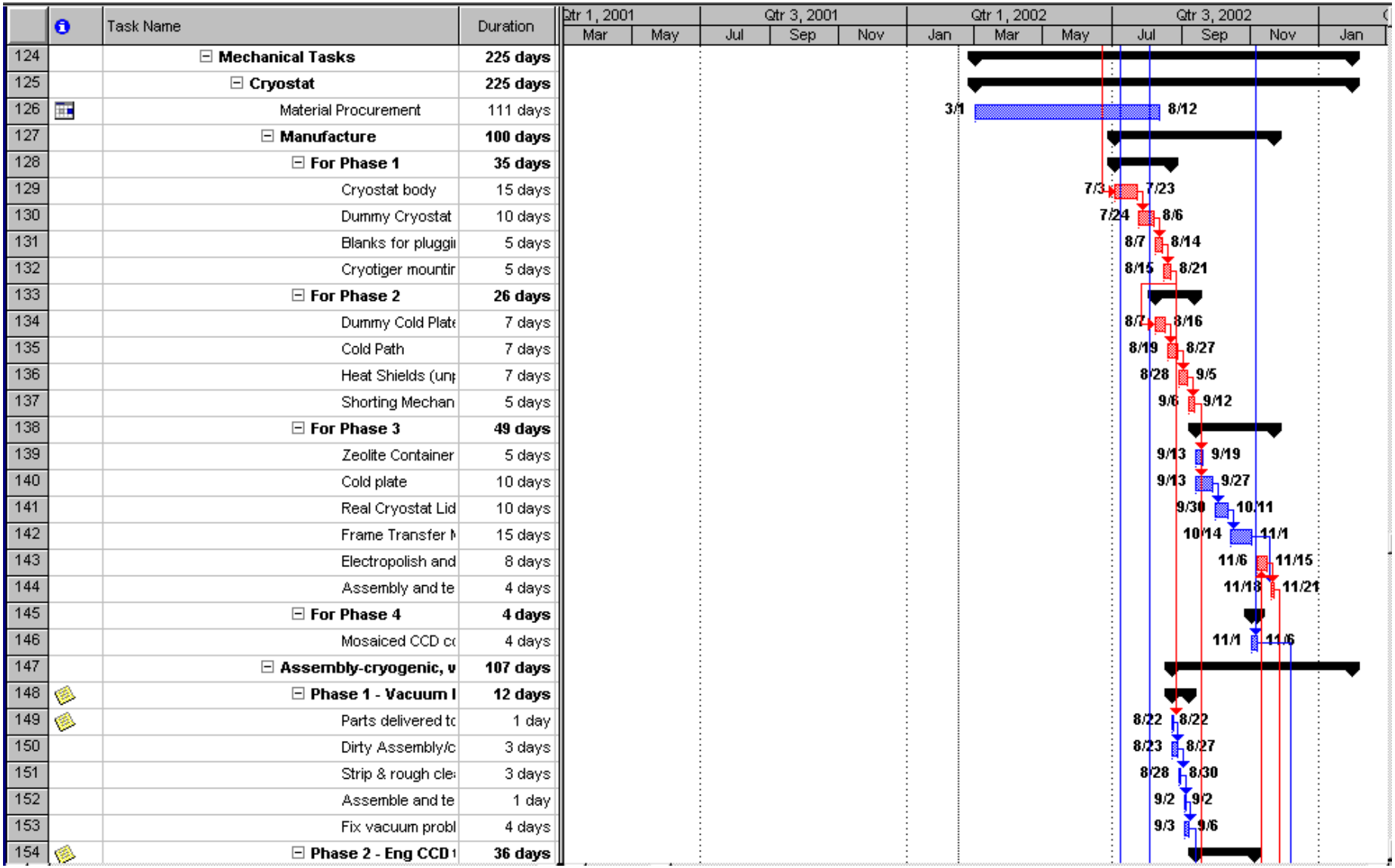




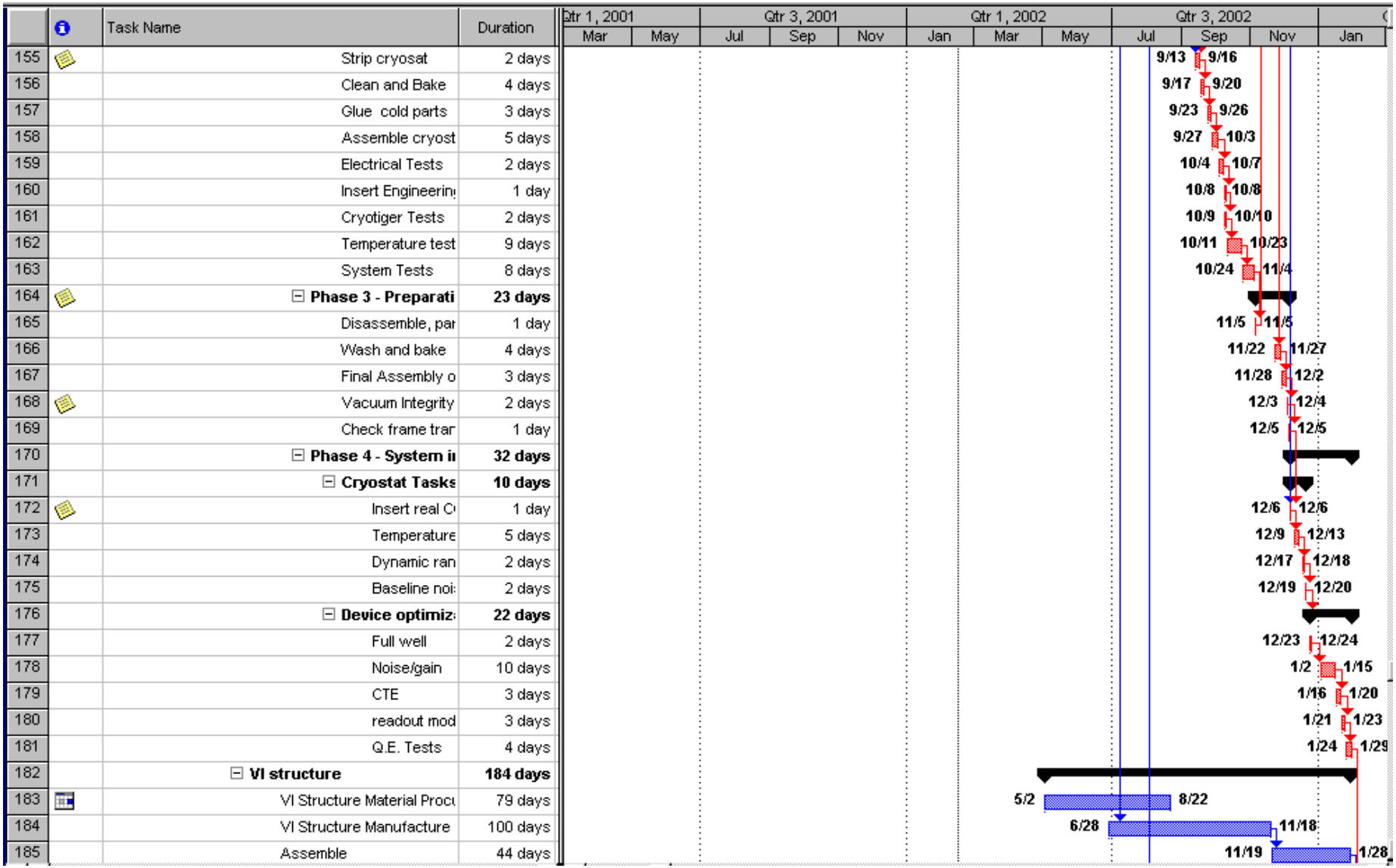
	Task Name	Duration
63	Detector Assembly	15 days
64	Vacuum Components	9 days
65	Heat Shields	5 days
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68	Front Plate	5 days
69	Frame Transfer mask	10 days
70	Frame Transfer Drive	14 days
71	Drawings	28 days
72	FDR Preparations	14 days
73	Cryostat Mechanical F	1 day
74	**VI Electronics Design**	**41 days**
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76	Rework manpower re	2 days
77	Rework budget	2 days
78	Schematics	35 days
79	**SDSU Controller Setup**	**13 days**
80	Check DAC clock boa	3 days
81	Check video board se	2 days
82	Waveform Table Defir	8 days
83	**SALTICAM Software**	**48 days**
84	DSP Software, write code	40 days
85	Host computer Software c	40 days
86	Software integration	8 days
87	**VI Final Design Documentat**	**5 days**
88	Electronics Documentatior	5 days
89	Software Documentation	5 days
90	**VI Final Design Review**	2 days
91	**VI FINAL DESIGN REVIEW CO**	0 days
92	**ACSI Design**	**171 days**
93	**ACSI Mechanical Desigi**	**130 days**



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93	**ACSI Mechanical Desig**	**130 days**
94	Concept Refinement	14 days
95	Structural Design and	39 days
96	Front Barrel	10 days
97	Rear Barrel and Focu	14 days
98	Autoguider	19 days
99	Shutter/Filter Manipula	10 days
100	Main Frame	15 days
101	Base Frame	9 days
102	Filter Cartridge	10 days
103	Covers	10 days
104	Handling Equipment	9 days
105	Drawings	66 days
106	**ACSI Electronics**	**30 days**
107	Rework PDR Design	5 days
108	Schematics	25 days
109	ACSI Final Design Docume	5 days
110	**ACSI Final Design Review**	2 days
111	**ACSI FINAL DESIGN REVIEW**	0 days
112	**Verification Instrument Manufactur**	**225 days**
113	**Electronic Tasks**	**20 days**
114	Check on schematics	4 days
115	Crate grounding/shielding	5 days
116	**Manufacture cables and te:**	**16 days**
117	Shutter cable	2 days
118	Cryostat to controller wirir	4 days
119	Cryostat Internal Wiring	3 days
120	Shorting Interface	1 day
121	Filter unit wiring	3 days
122	Electrical Connection Chec	3 days
123	**Software Development - Host C**	**60 days**



	Task Name	Duration
124	**Mechanical Tasks**	**225 days**
125	**Cryostat**	**225 days**
126	Material Procurement	111 days
127	**Manufacture**	**100 days**
128	**For Phase 1**	**35 days**
129	Cryostat body	15 days
130	Dummy Cryostat	10 days
131	Blanks for pluggi	5 days
132	Cryotiger mountir	5 days
133	**For Phase 2**	**26 days**
134	Dummy Cold Plate	7 days
135	Cold Path	7 days
136	Heat Shields (un	7 days
137	Shorting Mechan	5 days
138	**For Phase 3**	**49 days**
139	Zeolite Container	5 days
140	Cold plate	10 days
141	Real Cryostat Lid	10 days
142	Frame Transfer M	15 days
143	Electropolish and	8 days
144	Assembly and te	4 days
145	**For Phase 4**	**4 days**
146	Mosaiced CCD c	4 days
147	**Assembly-cryogenic, v**	**107 days**
148	**Phase 1 - Vacuum I**	**12 days**
149	Parts delivered tc	1 day
150	Dirty Assembly/c	3 days
151	Strip & rough cle	3 days
152	Assemble and te	1 day
153	Fix vacuum probl	4 days
154	**Phase 2 - Eng CCD**	**36 days**



	Task Name	Duration
155	Strip cryosat	2 days
156	Clean and Bake	4 days
157	Glue cold parts	3 days
158	Assemble cryost	5 days
159	Electrical Tests	2 days
160	Insert Engineerin	1 day
161	Cryotiger Tests	2 days
162	Temperature test	9 days
163	System Tests	8 days
164	**Phase 3 - Preparati**	**23 days**
165	Disassemble, par	1 day
166	Wash and bake	4 days
167	Final Assembly o	3 days
168	Vacuum Integrity	2 days
169	Check frame trar	1 day
170	**Phase 4 - System ii**	**32 days**
171	**Cryostat Tasks**	**10 days**
172	Insert real C	1 day
173	Temperature	5 days
174	Dynamic ran	2 days
175	Baseline noi	2 days
176	**Device optimiz**	**22 days**
177	Full well	2 days
178	Noise/gain	10 days
179	CTE	3 days
180	readout mod	3 days
181	Q.E. Tests	4 days
182	**VI structure**	**184 days**
183	VI Structure Material Procu	79 days
184	VI Structure Manufacture	100 days
185	Assemble	44 days

	Task Name	Duration
186	**VI MANUFACTURE COMPLETE**	0 days
187	Complete VI System Test	8 days
188	**Verification Instrument Documenta**	**128 days**
189	Phase 1 - linitial	25 days
190	Phase 2 - Final	5 days
191	**Pre-delivery Acceptance Test**	3 days
192	System Packaging	2 days
193	**VERIFICATION INSTRUMENT DELIVER**	0 days

