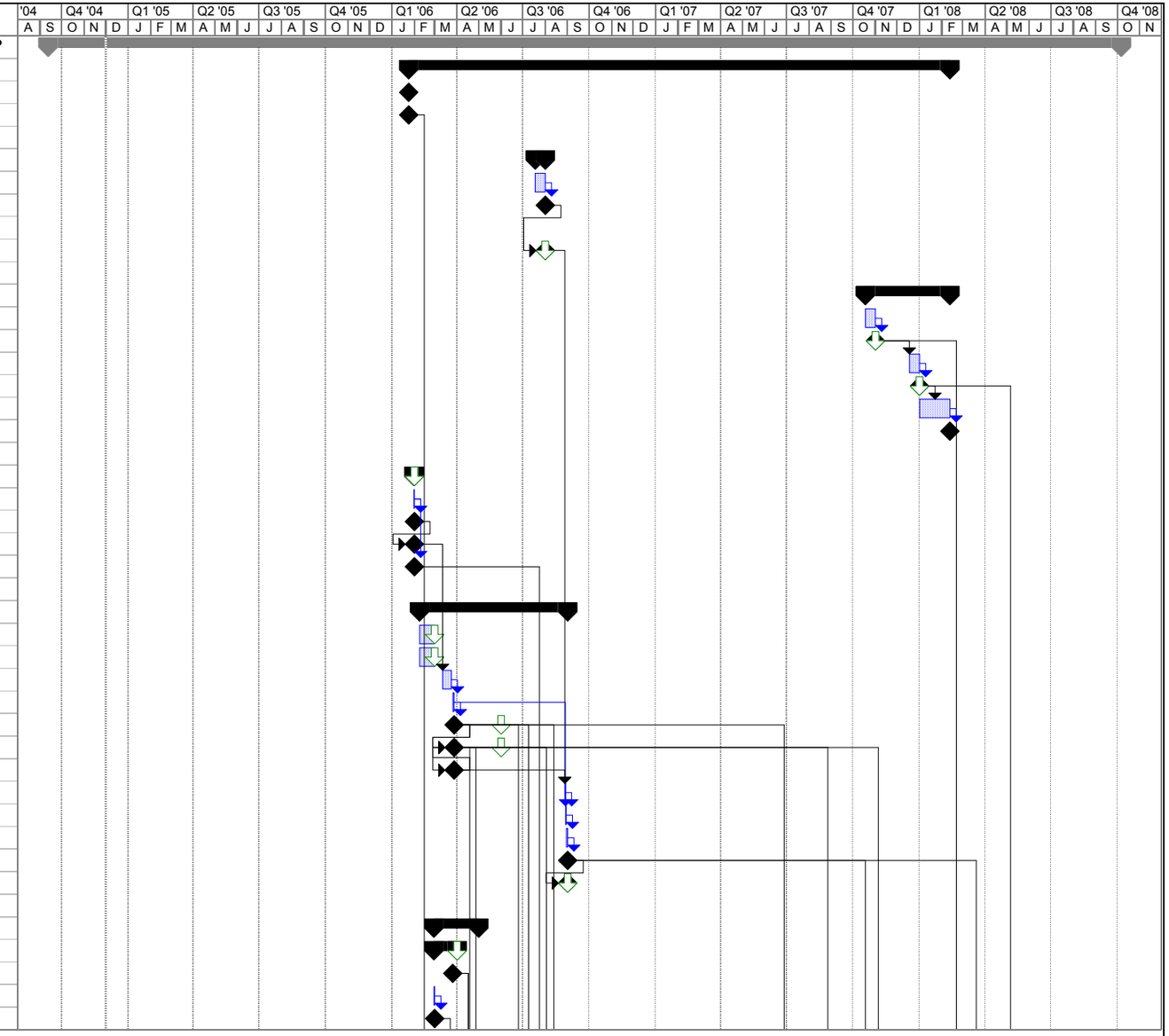
ID	ID	WBS	Task Name	Duration
0	**0**	**AIV_**	**Chilean System Integration**	**1061 days?**
1	**1**	**AIV_1**	**Infrastructure**	**535 days**
2	**2**	**AIV_1.1**	**Roadworks and hangers**	**0 days**
3	3	AIV_1.1.1	roadworks, hangers ready	0 days
4	4			
5	**5**	**AIV_1.2**	**AOS building**	**10 days**
6	6	AIV_1.2.1	detail	10 days
7	7	AIV_1.2.2	AOS TB ready for occupancy	0 days
8	8			
9	9	AIV_1.3	Data fibre between sites is available and checked out	0 days
10	10			
11	**11**	**AIV_1.4**	**AOS antenna pads**	**83 days**
12	12	AIV_1.4.1	Detail	10 days
13	13	AIV_1.4.2	Pad 1 accepted	0 days
14	14	AIV_1.4.3	Detail	10 days
15	15	AIV_1.4.4	Pad 2 and 3 accepted	0 days
16	16	AIV_1.4.5	Detail	30 days
17	17	AIV_1.4.6	Remaining early science pads accepted	0 days
18	18			
19	**19**	**AIV_1.5**	**OSF building and facilities**	**1 day**
20	20	AIV_1.5.1	details	1 day
21	21	AIV_1.5.2	Housing and logistic infrastructure ready	0 days
22	22	AIV_1.5.3	OSF Central Building ready for occupancy	0 days
23	23	AIV_1.5.4	ALMA OSF antenna pads ready for use	0 days
24	24			
25	**25**	**AIV_1.6**	**Computer Infrastructure**	**147 days**
26	26	AIV_1.6.1	Establish Maintenance and Config database	15 days
27	27	AIV_1.6.2	Establish Fault Reporting and Tracking system	15 days
28	28	AIV_1.6.3	details on OSF installation for M/C	10 days
29	29	AIV_1.6.4	AT(2) for M/C installation	2 days
30	30	AIV_1.6.5	M/C availabe in OSF labs	0 days
31	31	AIV_1.6.6	Data processing available at OSF	0 days
32	32	AIV_1.6.7	Comp Hand-Off to SI Computer Infrastructure (OSF)	0 days
33	33	AIV_1.6.8	details on AOS installation for M/C	1 day
34	34	AIV_1.6.9	check out M/C operation from OSF	1 day
35	35	AIV_1.6.10	AT(3) for M/C installation	2 days
36	36	AIV_1.6.11	M/C available at AOS	0 days
37	37	AIV_1.6.12	Comp Hand-Off to SI Computer Infrastructure (AOS)	0 days
38	38			
39	**39**	**AIV_1.7**	**Calibration infrastructure**	**44 days**
40	**40**	**AIV_1.7.1**	**Holography**	**23 days**
41	41	AIV_1.7.1.1	Tower is installed and available	0 days
42	42	AIV_1.7.1.2	In-House AT of holography electronics (7m)	1 day
43	43	AIV_1.7.1.3	Holograph electronics approved to ship	0 days



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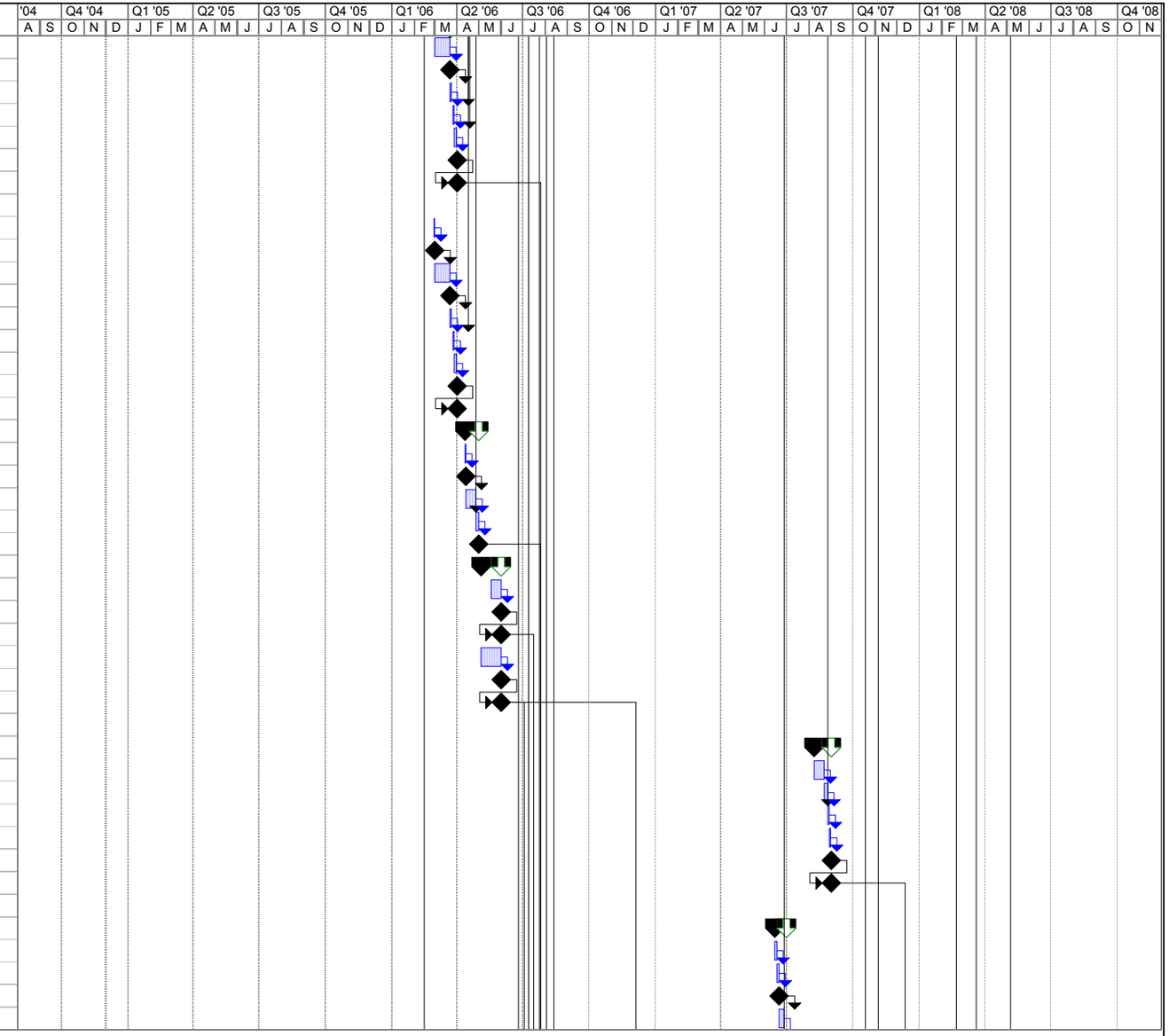
Task		Summary		Rolled Up Progress		Project Summary		Deadline			
Progress		Rolled Up Task		Split		External Milestone					
Milestone		Rolled Up Milestone		External Tasks		External Milestone					

ID	ID	WBS	Task Name	Duration
44	44	AIV_1.7.1.4	ship to OSF	15 days
45	45	AIV_1.7.1.5	Transmitter, cable, receiver arrive on site	0 days
46	46	AIV_1.7.1.6	functional checkout in lab	2 days
47	47	AIV_1.7.1.7	Install, cable up transmitter	2 days
48	48	AIV_1.7.1.8	functional checkout of system	3 days
49	49	AIV_1.7.1.9	Holograph subsystem is ready	0 days
50	50	AIV_1.7.1.10	Hand-Off to SI 7m_holograghy System	0 days
51	51			
52	52	AIV_1.7.1.11	In-House AT of holography electronics (12m)	1 day
53	53	AIV_1.7.1.12	Holograph electronics approved to ship	0 days
54	54	AIV_1.7.1.13	ship to OSF	15 days
55	55	AIV_1.7.1.14	Transmitter, cable, receiver arrive on site	0 days
56	56	AIV_1.7.1.15	functional checkout in lab	2 days
57	57	AIV_1.7.1.16	Install, cable up transmitter	2 days
58	58	AIV_1.7.1.17	functional checkout of system	3 days
59	59	AIV_1.7.1.18	Holograph subsystem is ready	0 days
60	60	AIV_1.7.1.19	Hand-Off to SI 12m_holograghy System	0 days
61	**61**	**AIV_1.7.2**	**Optical Pointing Telescopes**	**13 days**
62	62	AIV_1.7.2.1	In-House AT of 4 OPT	1 day
63	63	AIV_1.7.2.2	OPTs approved to ship	0 days
64	64	AIV_1.7.2.3	Ship	10 days
65	65	AIV_1.7.2.4	Post-shipping checkout	2 days
66	66	AIV_1.7.2.5	OPT subsystem ready	0 days
67	**67**	**AIV_1.8**	**Labs**	**20 days**
68	68	AIV_1.8.1	Outfit Digital lab	10 days
69	69	AIV_1.8.2	Digital lab ready	0 days
70	70	AIV_1.8.3	Digital Hand Off to SI Digital Lab Ready	0 days
71	71	AIV_1.8.4	Outfit RF lab	20 days
72	72	AIV_1.8.5	RF lab ready	0 days
73	73	AIV_1.8.6	RF Hand-Off to SI RF Lab Ready	0 days
74	74			
75	**75**	**AIV_1.9**	**Test Correlator**	**17 days**
76	76	AIV_1.9.1	Ship from ATF	10 days
77	77	AIV_1.9.2	Install temporarily at OSF	3 days
78	78	AIV_1.9.3	Cable up to power, data processing	2 days
79	79	AIV_1.9.4	check functionality	2 days
80	80	AIV_1.9.5	Test correlator is ready for use	0 days
81	81	AIV_1.9.6	PSI Hand-Off to SI Test Correlator	0 days
82	82			
83	**83**	**AIV_2**	**BE digital receiver electronics**	**10.33 days**
84	84	AIV_2.1	Acceptance tests	1 day
85	85	AIV_2.2	Integration and test with M/C	3 days
86	86	AIV_2.3	Hardware approved to ship, M/C accepted	0 days
87	87	AIV_2.4	Ship to correlator	5 days



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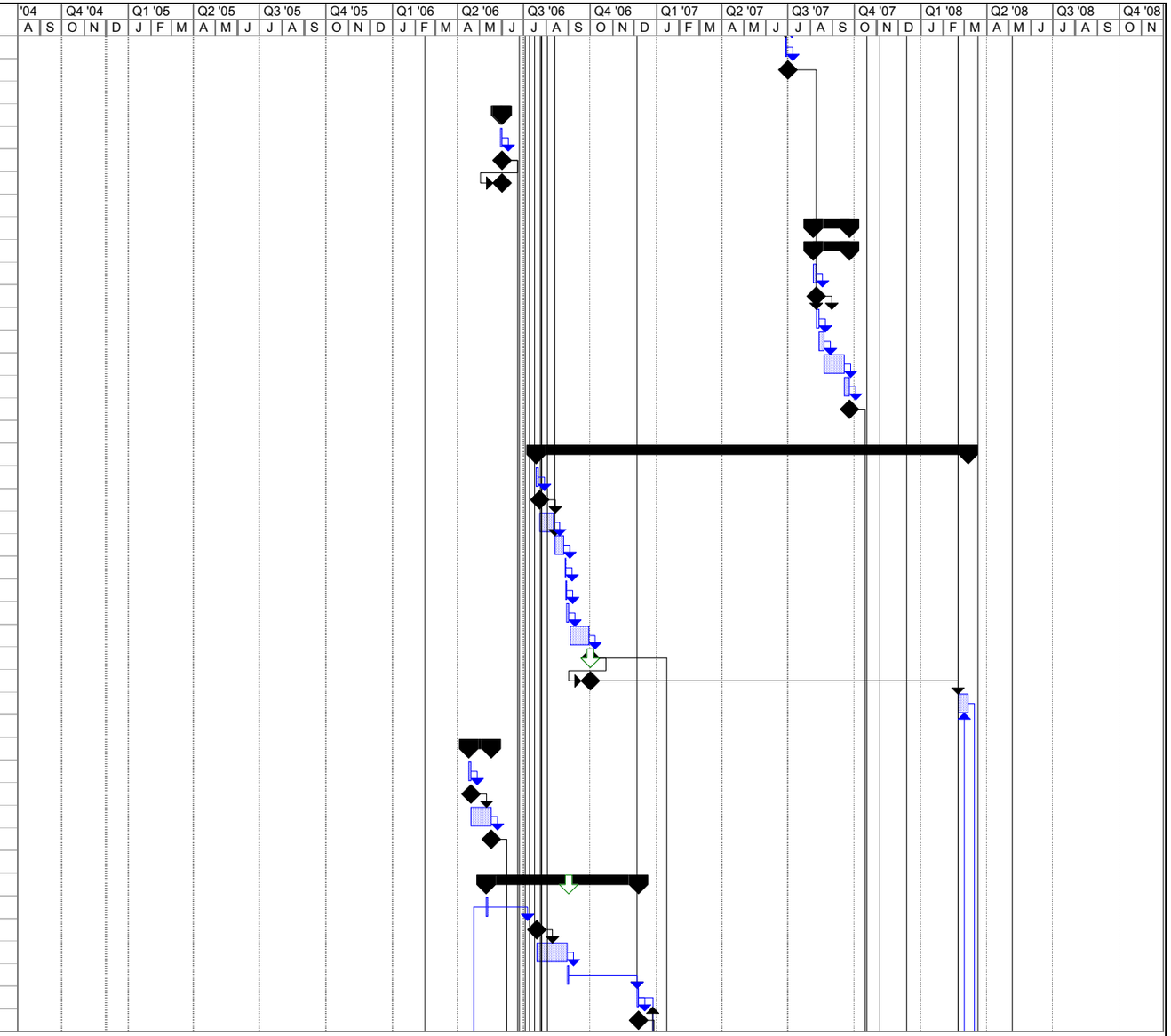
Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary | External Milestone | External Milestone | Deadline

ID	ID	WBS	Task Name	Duration
88	88	AIV_2.5	post-shipment checkout	1.33 days
89	89	AIV_2.6	BE Hand-Off to SI Digital Receiver	0 days
90	90			
91	**91**	**AIV_3**	**Computer IPT**	**2 days**
92	92	AIV_3.1	ABM In-House acceptance tests	2 days
93	93	AIV_3.2	ABM accepted, transfer to BE	0 days
94	94	AIV_3.3	(data processing handover TBDeveloped)	0 days
95	95			
96	**96**	**AIV_4**	**Correlator**	**36 days**
97	**97**	**AIV_4.1**	**1st bank**	**36 days**
98	98	AIV_4.1.1	Acceptance tests	4 days
99	99	AIV_4.1.2	Correlator provisionally accepted	0 days
100	100	AIV_4.1.3	Integrate digital receiver	2 days
101	101	AIV_4.1.4	test	5 days
102	102	AIV_4.1.5	Pack and ship to AOS	20 days
103	103	AIV_4.1.6	assemble	5 days
104	104	AIV_4.1.7	Correlator bank 1 ready to install at AOS	0 days
105	105			
106	**106**	**AIV_5**	**Central LO**	**427 days**
107	107	AIV_5.1	In-House acceptance tests - 8 stations	3 days
108	108	AIV_5.2	Central LO approved to ship	0 days
109	109	AIV_5.3	Ship to OSF	15 days
110	110	AIV_5.4	Unpack, reassemble, functionality check	10 days
111	111	AIV_5.5	Connect to OSF pads	1 day
112	112	AIV_5.6	Check power levels	1 day
113	113	AIV_5.7	Check LLC functionality	3 days
114	114	AIV_5.8	Working margin	20 days
115	115	AIV_5.9	Available for antenna 1	0 days
116	116	AIV_5.10	BE Hand-Off to SI Central LO	0 days
117	117	AIV_5.11	pack up and move to AOS	10 days
118	118			
119	**119**	**AIV_6**	**Photonic LO FE components**	**23 days**
120	120	AIV_6.1	In-House acceptance	3 days
121	121	AIV_6.2	Ready for FE	0 days
122	122	AIV_6.3	Working margin	20 days
123	123	AIV_6.4	BE Hand-Off to SI Photonic LO	0 days
124	124			
125	**125**	**AIV_7**	**FE Service Vehicle**	**150.5 days**
126	126	AIV_7.1	Service Vehicle acceptance	2 days
127	127	AIV_7.2	SV approved to ship	0 days
128	128	AIV_7.3	Ship SV to OSF	30 days
129	129	AIV_7.4	Post-shipment checkout of SV	2 days
130	130	AIV_7.5	Test SV access to lab and antenna	2 days
131	131	AIV_7.6	FE Hand-Off to SI FE Service Vehicle	0 days



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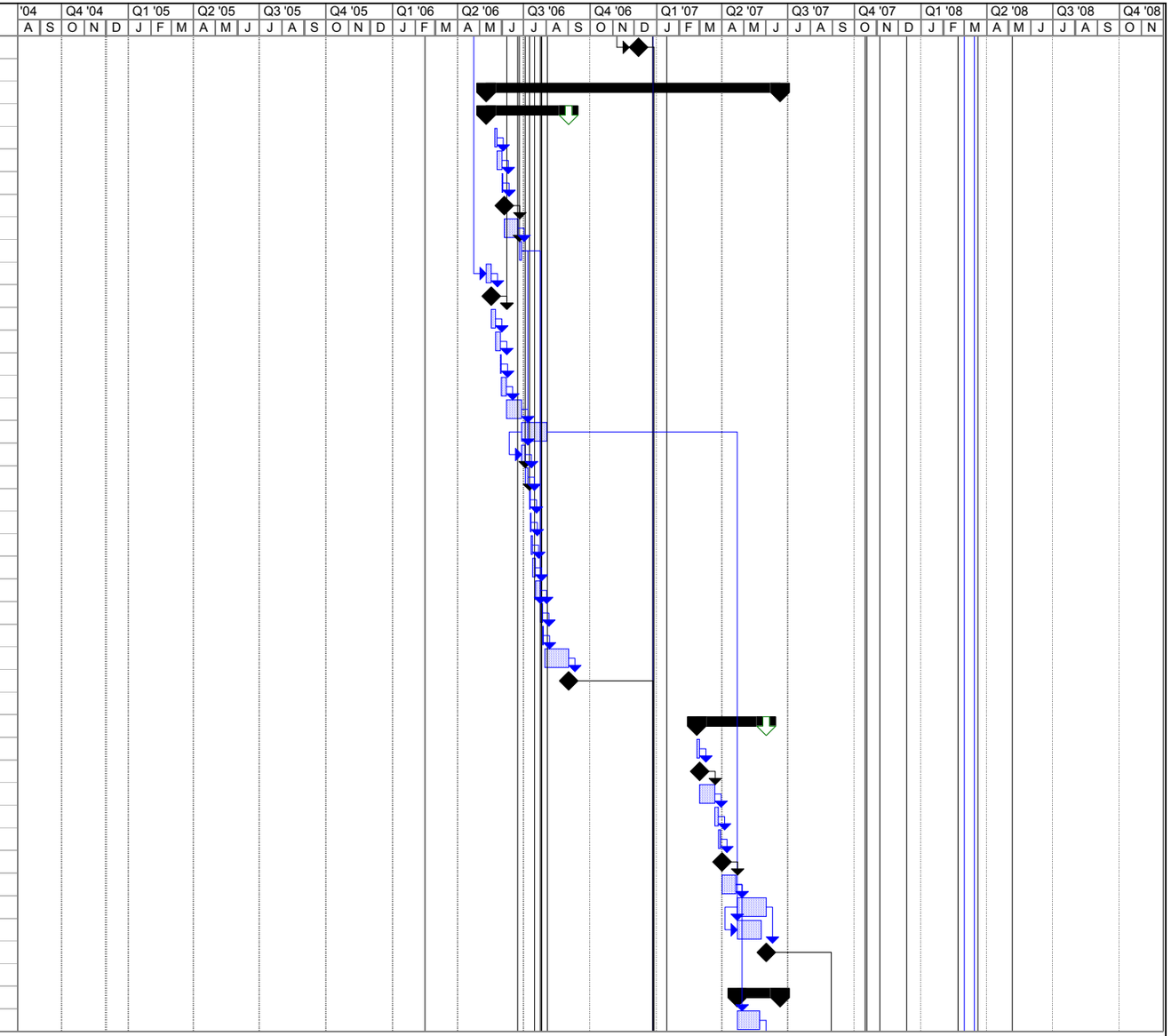
Task		Summary		Rolled Up Progress		Project Summary		Deadline	
Progress		Rolled Up Task		Split		External Milestone			
Milestone		Rolled Up Milestone		External Tasks		External Milestone			

ID	ID	WBS	Task Name	Duration
132	132	AIV_7.7	Ready for Operations	0 days
133	133			
134	**134**	**AIV_8**	**Front Ends**	**290 days?**
135	**135**	**AIV_8.1**	**FE#1**	**82 days?**
136	136	AIV_8.1.1	WVR #1 In-House Acceptance	3 days
137	137	AIV_8.1.2	Integration with M/C	5 days
138	138	AIV_8.1.3	M/C In-House Acceptance	1 day
139	139	AIV_8.1.4	WVR #1 approved to ship	0 days
140	140	AIV_8.1.5	Ship to OSF	15 days
141	141	AIV_8.1.6	Unpack, functional checkout	3 days
142	142	AIV_8.1.7	FE 1 In-House Acceptance	5 days
143	143	AIV_8.1.8	FE approved to ship	0 days
144	144	AIV_8.1.9	Integrate Photonic LO stuff	4 days
145	145	AIV_8.1.10	Integrate and test M/C	5 days
146	146	AIV_8.1.11	Complete checkout	1 day
147	147	AIV_8.1.12	Pack up	5 days
148	148	AIV_8.1.13	Ship to OSF	15 days
149	149	AIV_8.1.25	Develop FE checkout punchlist	25 days
150	150	AIV_8.1.14	Unpack, re-integrate	3 days
151	151	AIV_8.1.15	Install in lab	4 days
152	152	AIV_8.1.16	Power up, warm functionality check	1 day
153	153	AIV_8.1.17	Pump down	1 day
154	154	AIV_8.1.18	Cooldown	2 days
155	155	AIV_8.1.19	cold functionality check	2 days
156	156	AIV_8.1.20	Measure Tsys in all bands	5 days
157	157	AIV_8.1.21	Integrate WVR	3 days
158	158	AIV_8.1.22	Functional check of everything	1 day?
159	159	AIV_8.1.23	Working margin	25 days
160	160	AIV_8.1.24	FE Hand-Off to SI FE#1 Ready for Antenna	0 days
161	161			
162	**162**	**AIV_8.2**	**FE#2**	**70 days**
163	163	AIV_8.2.1	WVR #2 In-House Acceptance	4 days
164	164	AIV_8.2.2	WVR #2 approced to ship	0 days
165	165	AIV_8.2.3	Ship to OSF	15 days
166	166	AIV_8.2.4	Unpack, functional checkout	3 days
167	167	AIV_8.2.5	FE#2 In-House acceptance	3 days
168	168	AIV_8.2.6	FE#2 approved to ship	0 days
169	169	AIV_8.2.9	Ship to OSF	15 days
170	170	AIV_8.2.7	(repeat of above)	30 days
171	171	AIV_8.2.10	Test FE checkout punchlist	25 days
172	172	AIV_8.2.8	FE Hand-Off to SI FE#2 Ready for Antenna	0 days
173	173			
174	**174**	**AIV_8.3**	**FE#3**	**43 days**
175	175	AIV_8.3.19	(schedule delay)	23 days



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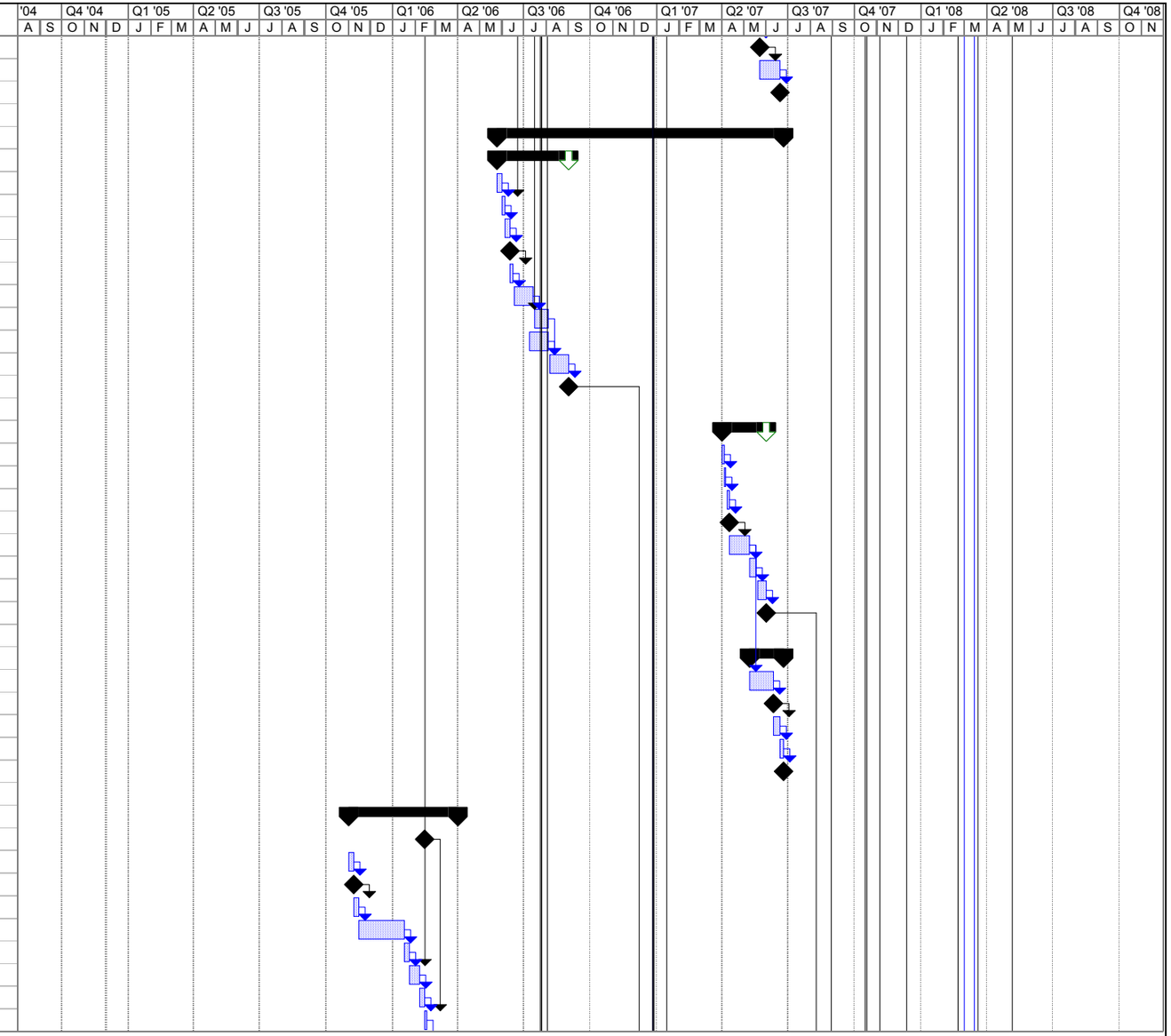
Task		Summary		Rolled Up Progress		Project Summary		Deadline	
Progress		Rolled Up Task		Split		External Milestone			
Milestone		Rolled Up Milestone		External Tasks		External Milestone			

ID	ID	WBS	Task Name	Duration
176	176	AIV_8.3.20	FE#3 arrives at OSF	0 days
177	177	AIV_8.3.21	Punchlist checkout	20 days
178	178	AIV_8.3.22	FE Hand-Off to SI FE#3 Ready for Antenna	0 days
179	179			
180	**180**	**AIV_9**	**BE antenna racks**	**282 days**
181	**181**	**AIV_9.1**	**BE#1**	**71 days**
182	182	AIV_9.1.1	In-House AT	5 days
183	183	AIV_9.1.2	Integrate ABM	2 days
184	184	AIV_9.1.3	Integrate and test M/C	5 days
185	185	AIV_9.1.4	M/C accepted, hardware approved to ship	0 days
186	186	AIV_9.1.5	Pack up	4 days
187	187	AIV_9.1.6	Ship BE to OSF	20 days
188	188	AIV_9.1.7	Reassemble and post-ship checkout	15 days
189	189	AIV_9.1.8	Ship FE simulator to OSF	20 days
190	190	AIV_9.1.10	Working margin	20 days
191	191	AIV_9.1.11	BE Hand-Off to SI BE#1 Ready for Antenna	0 days
192	192			
193	**193**	**AIV_9.2**	**BE#2**	**45 days**
194	194	AIV_9.2.1	In-House AT	3 days
195	195	AIV_9.2.2	Integrate ABM	2 days
196	196	AIV_9.2.3	Integrate and test M/C	3 days
197	197	AIV_9.2.4	hardware approved to ship	0 days
198	198	AIV_9.2.5	Ship BE to OSF	20 days
199	199	AIV_9.2.7	Reassemble and post-ship checkout	7 days
200	200	AIV_9.2.8	Working margin	10 days
201	201	AIV_9.2.9	BE Hand-Off to SI BE#2 Ready for Antenna	0 days
202	202			
203	**203**	**AIV_9.3**	**BE#3**	**33 days**
204	204	AIV_9.3.32	(schedule delay)	23 days
205	205	AIV_9.3.33	BE arrives at OSF	0 days
206	206	AIV_9.3.34	Reassemble and post-ship checkout	7 days
207	207	AIV_9.3.35	Working margin	3 days
208	208	AIV_9.3.36	BE Hand-Off to SI BE#3 Ready for Antenna	0 days
209	209			
210	**210**	**AIV_10**	**Antenna Transporter #1**	**108 days**
211	211	AIV_10.1	APU delivered to OSF	0 days
212	212	AIV_10.2	Transporter In-House AT	5 days
213	213	AIV_10.3	Approved to ship	0 days
214	214	AIV_10.4	disassemble, prep for shipping	5 days
215	215	AIV_10.5	Ship to OSF	45 days
216	216	AIV_10.6	reassemble	5 days
217	217	AIV_10.7	Post-ship checkout	10 days
218	218	AIV_10.8	Test maneuvering and navigating modes	5 days
219	219	AIV_10.9	Install APU, check functionality	3 days



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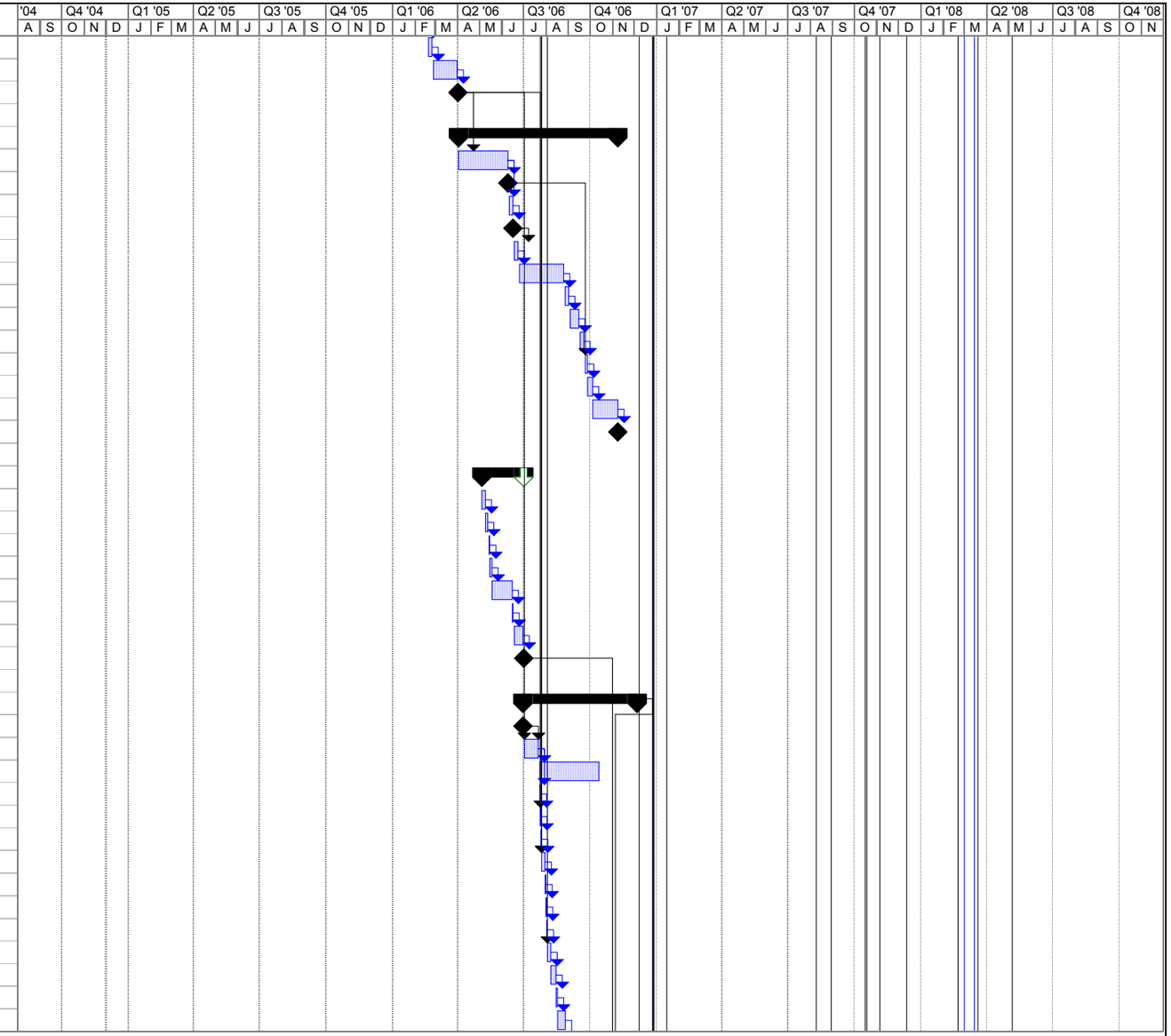
Task		Summary		Rolled Up Progress		Project Summary		Deadline	
Progress		Rolled Up Task		Split		External Milestone			
Milestone		Rolled Up Milestone		External Tasks		External Milestone			

ID	ID	WBS	Task Name	Duration
220	220	AIV_10.10	Driver training	5 days
221	221	AIV_10.11	Working margin	25 days
222	222	AIV_10.12	Ant Hand-Off to SI Transporter #1	0 days
223	223			
224	**224**	**AIV_11**	**Antenna Transporter #2**	**158 days**
225	225	AIV_11.1	(arbitratry start date, for now)	50 days
226	226	AIV_11.2	APU delivered to OSF	0 days
227	227	AIV_11.3	Transporter In-House AT	5 days
228	228	AIV_11.4	Approved to ship	0 days
229	229	AIV_11.5	disassemble, prep for shipping	5 days
230	230	AIV_11.6	Ship to OSF	45 days
231	231	AIV_11.7	reassemble	5 days
232	232	AIV_11.8	Post-ship checkout	10 days
233	233	AIV_11.9	Test maneuvering and navigating modes	5 days
234	234	AIV_11.10	Install APU, check functionality	3 days
235	235	AIV_11.11	Driver training	5 days
236	236	AIV_11.12	Working margin	25 days
237	237	AIV_11.13	Ant Hand-Off to SI Transporter #2	0 days
238	238			
239	**239**	**AIV_12**	**Nutating M2**	**41 days**
240	240	AIV_12.1	In-House AT	3 days
241	241	AIV_12.2	Integrate with M/C, check operation	3 days
242	242	AIV_12.3	M/C accepted, hardware approved to ship	1 day
243	243	AIV_12.4	Pack up	3 days
244	244	AIV_12.5	ship to OSF lab	20 days
245	245	AIV_12.6	Post-shipping checkout and functionality check in lab	1 day
246	246	AIV_12.7	Working margin	10 days
247	247	AIV_12.8	Available for antenna integration	0 days
248	248			
249	**249**	**AIV_13**	**Antenna 1/64**	**111.5 days**
250	250	AIV_13.1	Antenna 1 available for AT at contractor's pad	0 days
251	251	AIV_13.2	Phase 1 AT	15 days
252	252	AIV_13.31	Develop antenna checkout punchlist	60 days
253	253	AIV_13.3	Install transporter ears	1 day
254	254	AIV_13.4	Move to ALMA pad O5	0.5 days
255	255	AIV_13.5	Antenna functional check	1 day
256	256	AIV_13.6	Install + cable up temporary ABM, holog receiver, OPT	3 days
257	257	AIV_13.7	Functionality Check: M/C controls antenna	1 day
258	258	AIV_13.8	Start a full-time monitor and logging task	1 day
259	259	AIV_13.9	Funct. Check: OPT and holog receiver	1 day
260	260	AIV_13.10	Check that holog control and data reduction are working	3 days
261	261	AIV_13.11	Surface measurement	5 days
262	262	AIV_13.12	set panels	2 days
263	263	AIV_13.13	Repeat surface measurement and setting until acceptable	7 days



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Task		Summary		Rolled Up Progress		Project Summary		Deadline	
Progress		Rolled Up Task		Split		External Milestone			
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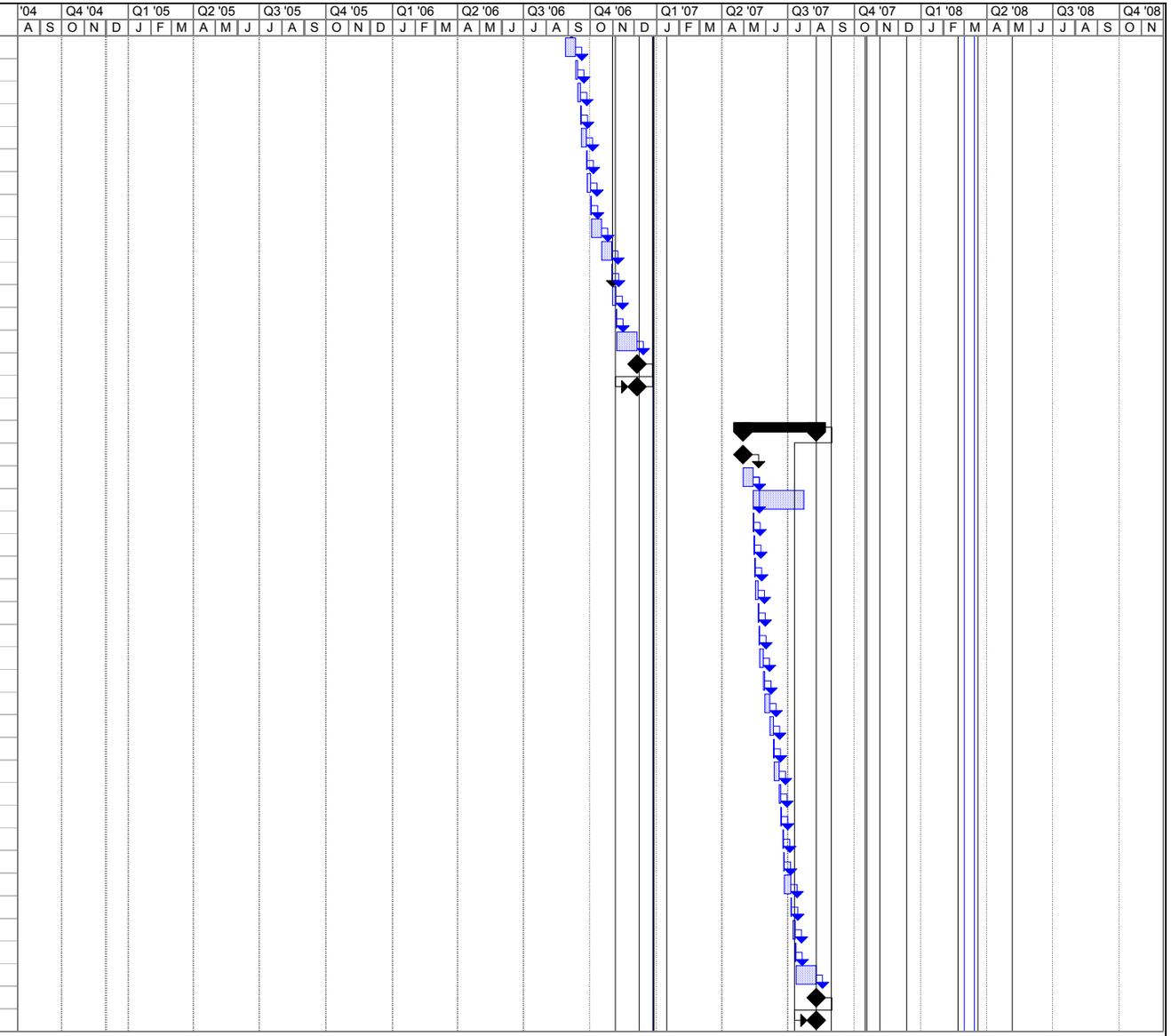
ID	ID	WBS	Task Name	Duration
264	264	AIV_13.14	Optical pointing run, tracking tests	10 days
265	265	AIV_13.16	stow el, shut down, move antenna to pad O2, cable up	3 days
266	266	AIV_13.17	functional check of antenna, OPT, holog rx	2 days
267	267	AIV_13.18	Holography to confirm panel setting remains good	1 day
268	268	AIV_13.19	stow, shutdown, move antenna to AOS and back to O1, cable up	5 days
269	269	AIV_13.20	functional check of antenna, OPT, holog rx	1 day
270	270	AIV_13.21	remeasure optical pointing solution	3 days
271	271	AIV_13.22	Holography to confirm panel setting remains good	1 day
272	272	AIV_13.30	Margin: Holography	10 days
273	273	AIV_13.23	Phase 2 AT	10 days
274	274	AIV_13.24	remove holog RX	1 day
275	275	AIV_13.25	Install M2 nutator, cabling and drivers	3 days
276	276	AIV_13.26	Check out nutator functionality using M/C	1 day
277	277	AIV_13.27	Working margin	20 days
278	278	AIV_13.28	Assign ALMA identifier to antenna	0 days
279	279	AIV_13.29	Antenna, Nutator, OPT Hand-Off to SI	0 days
280	280			
281	**281**	**AIV_14**	**Antenna 2/64**	**73 days**
282	282	AIV_14.1	Antenna 2 available for AT at contractor's pad	0 days
283	283	AIV_14.2	Phase 1 AT	10 days
284	284	AIV_14.28	Test antenna checkout punchlist	50 days
285	285	AIV_14.3	Install transporter ears	1 day
286	286	AIV_14.4	Move to ALMA pad O5	1 day
287	287	AIV_14.5	Antenna functional check	1 day
288	288	AIV_14.6	Install + cable up temporary ABM, holog receiver, OPT	2 days
289	289	AIV_14.7	Functionality Check: M/C controls antenna	1 day
290	290	AIV_14.8	Fucnt. Check: OPT and holog receiver	1 day
291	291	AIV_14.9	Surface measurement	3 days
292	292	AIV_14.10	set panels	2 days
293	293	AIV_14.11	Repeat surface measurement and setting until acceptable	5 days
294	294	AIV_14.12	Optical pointing run, tracking test	3 days
295	295	AIV_14.13	Check solution	1 day
296	296	AIV_14.14	stow el, shut down, move antenna to pad O4, cable up	5 days
297	297	AIV_14.15	functional check of antenna, OPT, holog rx	2 days
298	298	AIV_14.16	Holography to confirm panel setting remains good	1 day
299	299	AIV_14.17	remeasure optical pointing solution	1 day
300	300	AIV_14.18	Holography to confirm panel setting remains good	1 day
301	301	AIV_14.19	Phase 2 AT	7 days
302	302	AIV_14.20	remove holog RX	1 day
303	303	AIV_14.21	Install M2 nutator, cabling and drivers	3 days
304	304	AIV_14.22	Check out nutator functionality using M/C	1 day
305	305	AIV_14.23	Working margin	20 days
306	306	AIV_14.24	Assing ALMA identifier to antenna	0 days
307	307	AIV_14.25	Antenna, Nutator, OPT Hand-Off to SI	0 days



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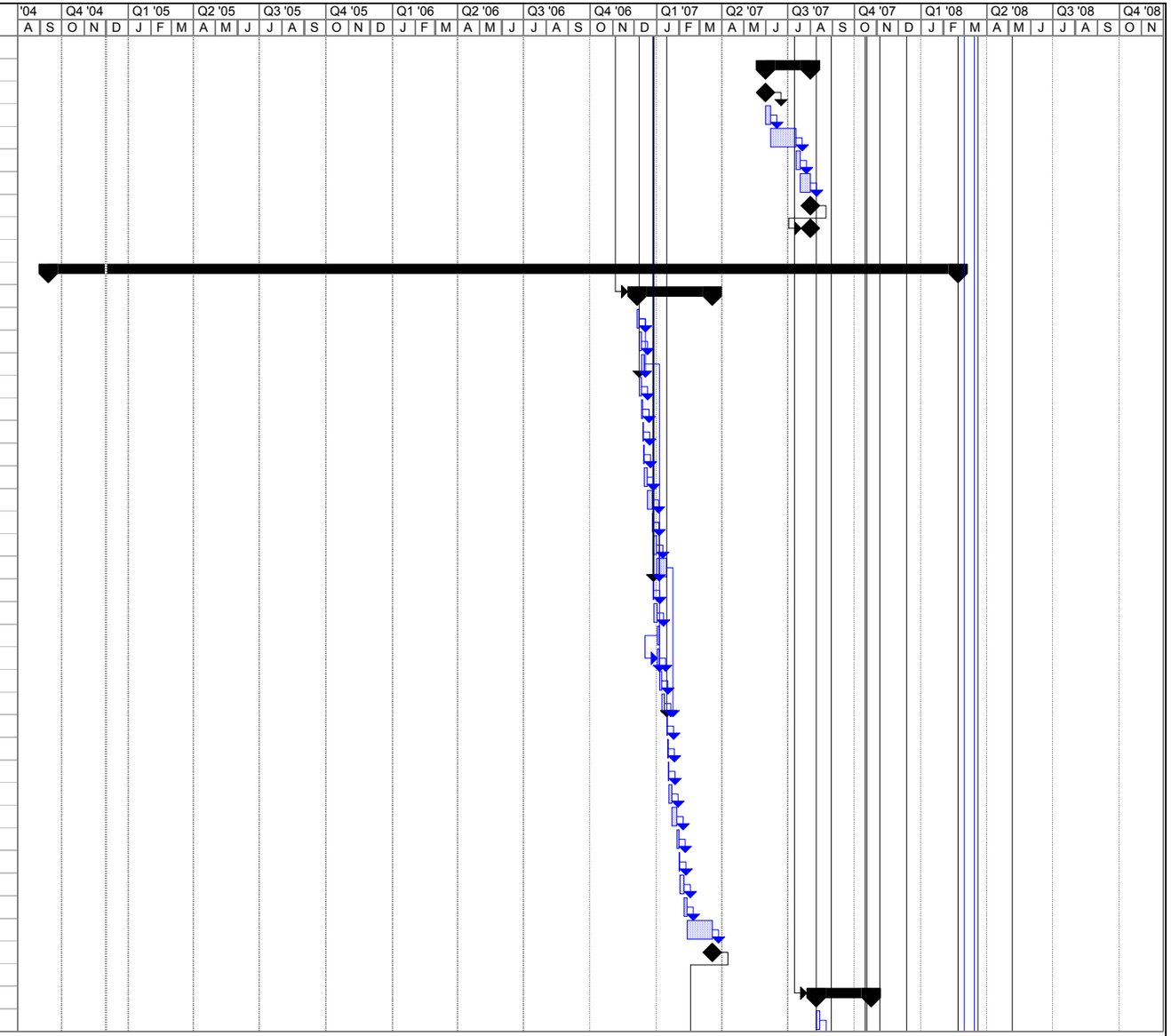
Progress		Rolled Up Task		Split		External Milestone			
Milestone		Rolled Up Milestone		External Tasks		External Milestone			

ID	ID	WBS	Task Name	Duration
308	308			
309	**309**	**AIV_41**	**Antenna 3/64**	**44 days**
310	310	AIV_41.80	Antenna 3 available for AT at contractor's pad	0 days
311	311	AIV_41.81	Phase 1 AT	5 days
312	312	AIV_41.82	Test antenna checkout punchlist(A)	25 days
313	313	AIV_41.83	Phase 2 AT	4 days
314	314	AIV_41.84	Test antenna checkout punchlist(B)	10 days
315	315	AIV_41.85	Assign ALMA identifier to antenna	0 days
316	316	AIV_41.86	Antenna, Nutator, OPT Hand-Off to SI	0 days
317	317			
318	**318**	**AIV_15**	**Subsystem integration and test**	**899 days**
319	**319**	**AIV_15.1**	**Antenna 1 integration**	**74 days**
320	320	AIV_15.1.1	Cable up, plumb antenna for He system	3 days
321	321	AIV_15.1.2	Install He compressor	1 day
322	322	AIV_15.1.3	Clean lines	4 days
323	323	AIV_15.1.4	Move BE#1 to antenna	1 day
324	324	AIV_15.1.5	Fit, mount in antenna	2 days
325	325	AIV_15.1.6	Connect to HVAC	1 day
326	326	AIV_15.1.7	Cable up ABM to network	1 day
327	327	AIV_15.1.8	Power up ABM and check out connection to ctrl bldg	2 days
328	328	AIV_15.1.9	Power up remainder of rack, functionality check.	5 days
329	329	AIV_15.1.10	Connect FE simulator to BE	1 day
330	330	AIV_15.1.11	Connect digital output to CB, test data at CB	3 days
331	331	AIV_15.1.12	Working margin	10 days
332	332	AIV_15.1.13	Move FE#1 to antenna	1 day
333	333	AIV_15.1.14	Fit, mount, connect to power and network	3 days
334	334	AIV_15.1.15	Start pumping down	3 days
335	335	AIV_15.1.16	Functionality check of warm FE, solar, WVR, calibration	3 days
336	336	AIV_15.1.17	Connect to cryo system, start cooling	1 day
337	337	AIV_15.1.18	Route LO through antenna	4 days
338	338	AIV_15.1.19	Connect LO to FE and BE	1 day
339	339	AIV_15.1.20	check that BE is getting good LO signals	1 day
340	340	AIV_15.1.21	check that 1st LO and FLOO are being generated correctly	1 day
341	341	AIV_15.1.22	check central LO (LLC) are functioning correctly	2 days
342	342	AIV_15.1.23	characterize LO (LLC) robustness to antenna movement, vibration, etc.	5 days
343	343	AIV_15.1.24	If cold, then do cold functionality check	3 days
344	344	AIV_15.1.25	Connect IF from FE to BE	1 day
345	345	AIV_15.1.26	Run system total power checkout (all bands)	4 days
346	346	AIV_15.1.27	Measure Trx and Tsys for all bands	2 days
347	347	AIV_15.1.28	Working margin	25 days
348	348	AIV_15.1.29	Antenna 1 ready for total power use	0 days
349	349			
350	**350**	**AIV_15.2**	**Antenna 2 integration**	**54 days**
351	351	AIV_15.2.1	Cable up, plumb antenna for He system	3 days



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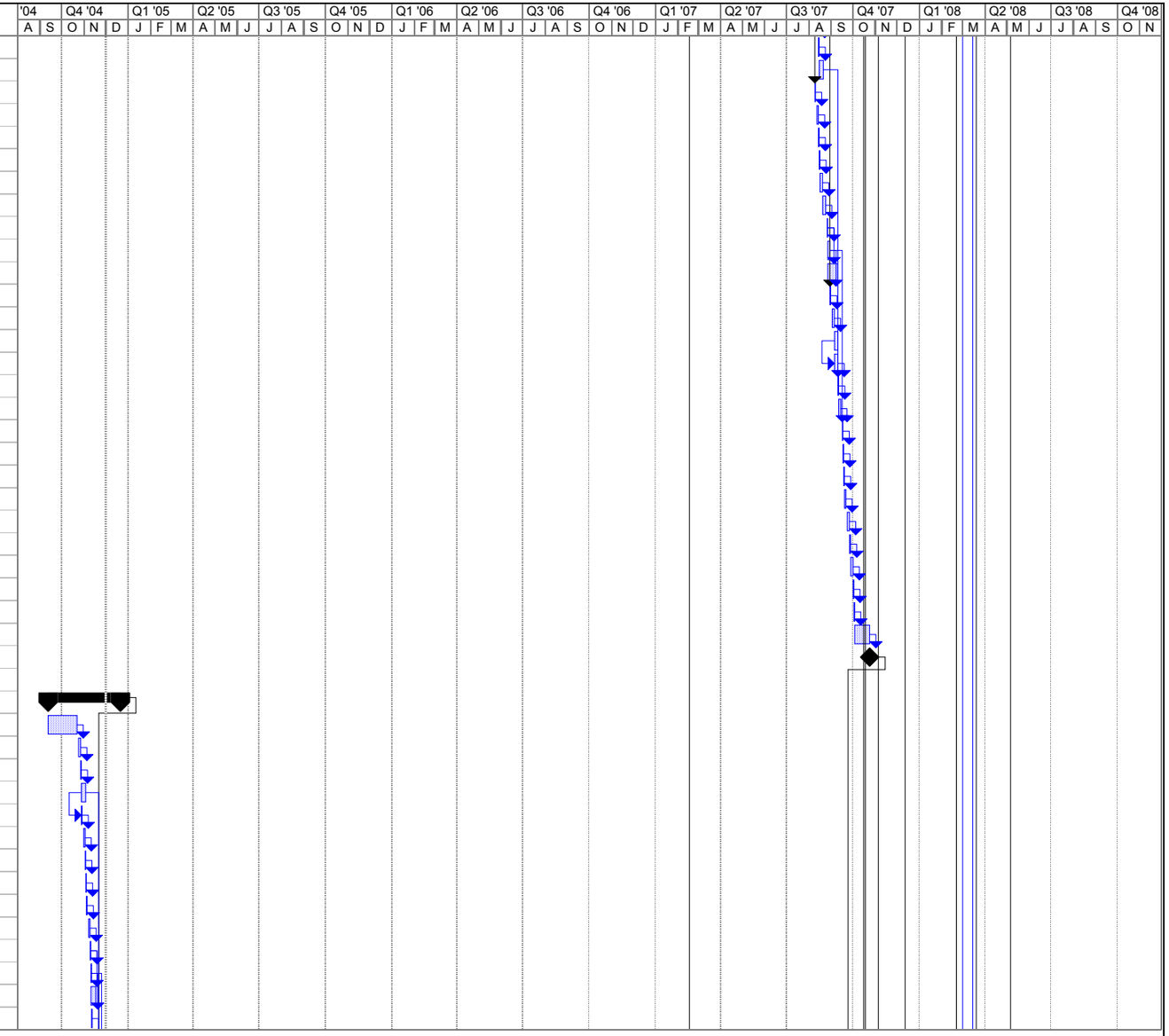
Progress		Rolled Up Task		Split		External Milestone			
Milestone		Rolled Up Milestone		External Tasks		External Milestone			

ID	ID	WBS	Task Name	Duration
352	352	AIV_15.2.2	Install He compressor	1 day
353	353	AIV_15.2.3	Clean lines	4 days
354	354	AIV_15.2.4	Move BE#2 to antenna	1 day
355	355	AIV_15.2.5	Fit, mount in antenna	2 days
356	356	AIV_15.2.6	Connect to HVAC	1 day
357	357	AIV_15.2.7	Cable up ABM to network	1 day
358	358	AIV_15.2.8	Power up ABM and check out connection to ctrl bldg	2 days
359	359	AIV_15.2.9	Power up remainder of rack, functionality check.	4 days
360	360	AIV_15.2.10	Connect FE simulator to BE	1 day
361	361	AIV_15.2.11	Connect digital output to CB, test data at CB	3 days
362	362	AIV_15.2.12	Working margin	10 days
363	363	AIV_15.2.13	Move FE#2 to antenna	1 day
364	364	AIV_15.2.14	Fit, mount, connect to power and network	3 days
365	365	AIV_15.2.15	Start pumping down	3 days
366	366	AIV_15.2.16	Functionality check ofwarm FE, solar, WVR, calibration	3 days
367	367	AIV_15.2.17	Connect to cryo system, start cooling	1 day
368	368	AIV_15.2.18	Route LO through antenna	3 days
369	369	AIV_15.2.19	Connect LO to FE and BE	1 day
370	370	AIV_15.2.20	check that BE is getting good LO signals	1 day
371	371	AIV_15.2.21	check that 1st LO and FLOO are being generated correctly	1 day
372	372	AIV_15.2.22	check central LO (LLC) are functioning correctly	2 days
373	373	AIV_15.2.23	characterize LO (LLC) robustness to antenna movement, vibration, etc.	3 days
374	374	AIV_15.2.24	If cold, then do cold functionality check	1.5 days
375	375	AIV_15.2.25	Connect IF from FE to BE	1.5 days
376	376	AIV_15.2.26	Run system total power checkout (all bands)	1 day
377	377	AIV_15.2.27	Measure Trx and Tsys for all bands	1 day
378	378	AIV_15.2.28	Working margin	15 days
379	379	AIV_15.2.29	Antenna 2 ready for total power use	0 days
380	380			
381	**381**	**AIV_15.4**	**Antenna 3 integration**	**72 days**
382	382	AIV_15.4.88	Delay for staff load balancing	30 days
383	383	AIV_15.4.59	Cable up, plumb antenna for He system	3 days
384	384	AIV_15.4.60	Install He compressor	1 day
385	385	AIV_15.4.61	Clean lines	4 days
386	386	AIV_15.4.62	Move BE#3 to antenna	1 day
387	387	AIV_15.4.63	Fit, mount in antenna	2 days
388	388	AIV_15.4.64	Connect to HVAC	1 day
389	389	AIV_15.4.65	Cable up ABM to network	1 day
390	390	AIV_15.4.66	Power up ABM and check out connection to ctrl bldg	1 day
391	391	AIV_15.4.67	Power up remainder of rack, functionality check.	2 days
392	392	AIV_15.4.68	Connect FE simulator to BE	1 day
393	393	AIV_15.4.69	Connect digital output to CB, test data at CB	1 day
394	394	AIV_15.4.70	Working margin	5 days
395	395	AIV_15.4.71	Move FE#3 to antenna	1 day



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Progress		Rolled Up Task		Split		External Milestone			
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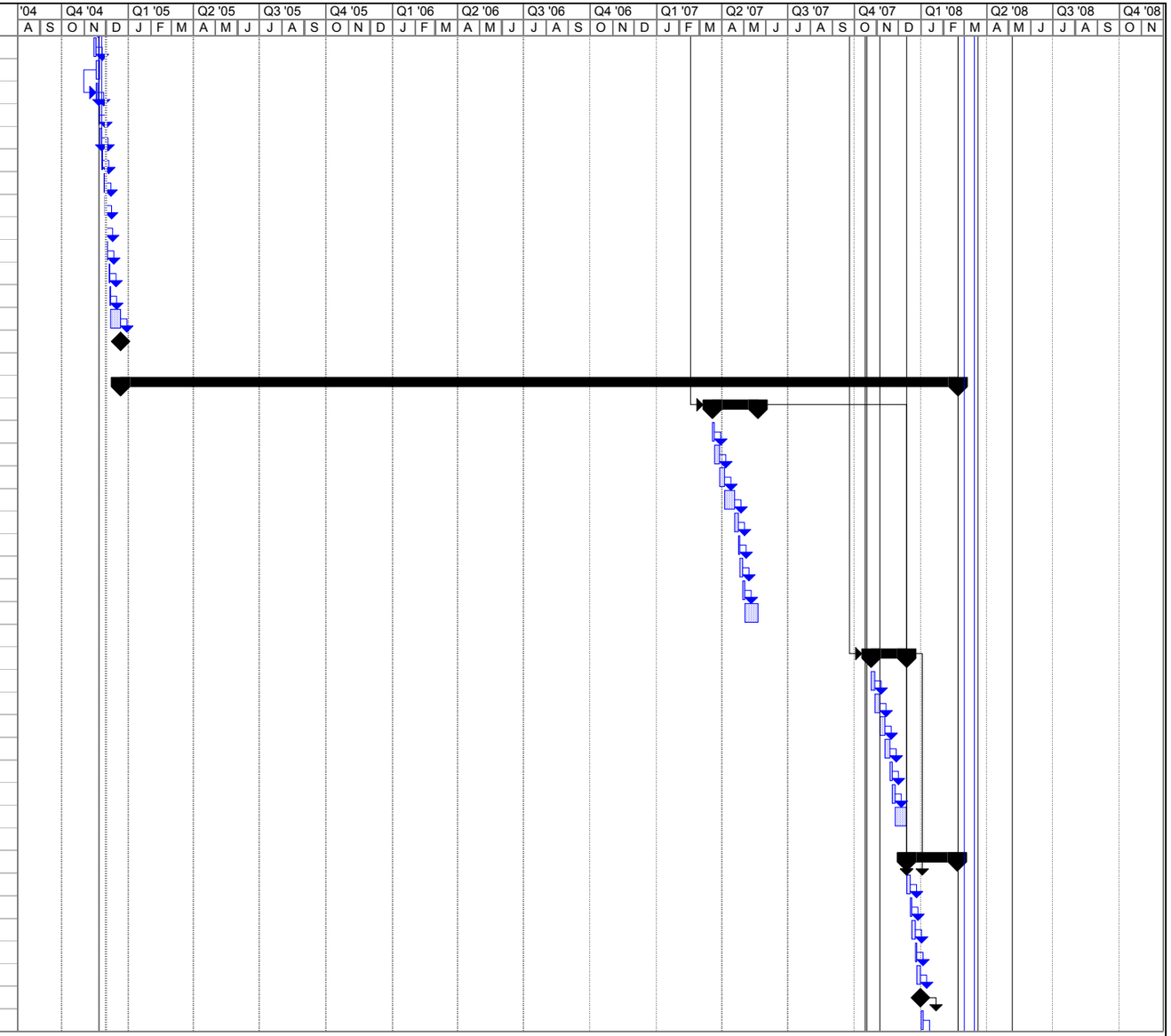
ID	ID	WBS	Task Name	Duration
396	396	AIV_15.4.72	Fit, mount, connect to power and network	3 days
397	397	AIV_15.4.73	Start pumping down	3 days
398	398	AIV_15.4.74	Functionality check ofwarm FE, solar, WVR, calibration	2 days
399	399	AIV_15.4.75	Connect to cryo system, start cooling	1 day
400	400	AIV_15.4.76	Route LO through antenna	3 days
401	401	AIV_15.4.77	Connect LO to FE and BE	1 day
402	402	AIV_15.4.78	check that BE is getting good LO signals	1 day
403	403	AIV_15.4.79	check that 1st LO and FLOO are being generated correctly	1 day
404	404	AIV_15.4.82	If cold, then do cold functionality check	1.5 days
405	405	AIV_15.4.83	Connect IF from FE to BE	1.5 days
406	406	AIV_15.4.84	Run system total power checkout (all bands)	1 day
407	407	AIV_15.4.85	Measure Trx and Tsys for all bands	1 day
408	408	AIV_15.4.86	Working margin	10 days
409	409	AIV_15.4.87	Antenna 3 ready for total power use	0 days
410	410			
411	**411**	**AIV_15.3**	**OSF checkout**	**827 days**
412	**412**	**AIV_15.3.1**	**Antenna 1 total power**	**45 days**
413	413	AIV_15.3.1.1	Confirm nutator throw and performance	3 days
414	414	AIV_15.3.1.8	Measue aO performance; update model	5 days
415	415	AIV_15.3.1.2	Measure beam profile in all bands, fn of elevation	5 days
416	416	AIV_15.3.1.9	Measure radio pointing, tracking	10 days
417	417	AIV_15.3.1.3	Measure (radio pointing - optical pointing) vs ZD	3 days
418	418	AIV_15.3.1.4	Confirm safe and linear performance in solar mode	2 days
419	419	AIV_15.3.1.5	Phase 3 antenna AT	2 days
420	420	AIV_15.3.1.6	Measure TP sensitivity in band 3	3 days
421	421	AIV_15.3.1.7	Working margin	12 days
422	422			
423	**423**	**AIV_15.3.2**	**Antenna 2 total power**	**35 days**
424	424	AIV_15.3.2.1	Confirm nutator throw and performance	3 days
425	425	AIV_15.3.2.7	Measue aO performance; update model	5 days
426	426	AIV_15.3.2.2	Measure beam profile in all bands, fn of elevation	5 days
427	427	AIV_15.3.2.6	Measure radio pointing, tracking	5 days
428	428	AIV_15.3.2.3	Measure (radio pointing - optical pointing) vs ZD	3 days
429	429	AIV_15.3.2.4	Confirm safe and linear performance in solar mode	2 days
430	430	AIV_15.3.2.5	Working margin	12 days
431	431			
432	**432**	**AIV_15.3.3**	**Interferometer pair**	**50 days**
433	433	AIV_15.3.3.1	Connect fibres to test correlator	3 days
434	434	AIV_15.3.3.2	generate a weak noise+line source at OSF lab	2 days
435	435	AIV_15.3.3.3	Check antenna 1 autocorrelation	3 days
436	436	AIV_15.3.3.4	Check antenna 2 autocorrelation	2 days
437	437	AIV_15.3.3.5	Look for fringes	3 days
438	438	AIV_15.3.3.6	celebrate	1 day
439	439	AIV_15.3.3.7	Measure interferometric sensitiviy in band 3	3 days



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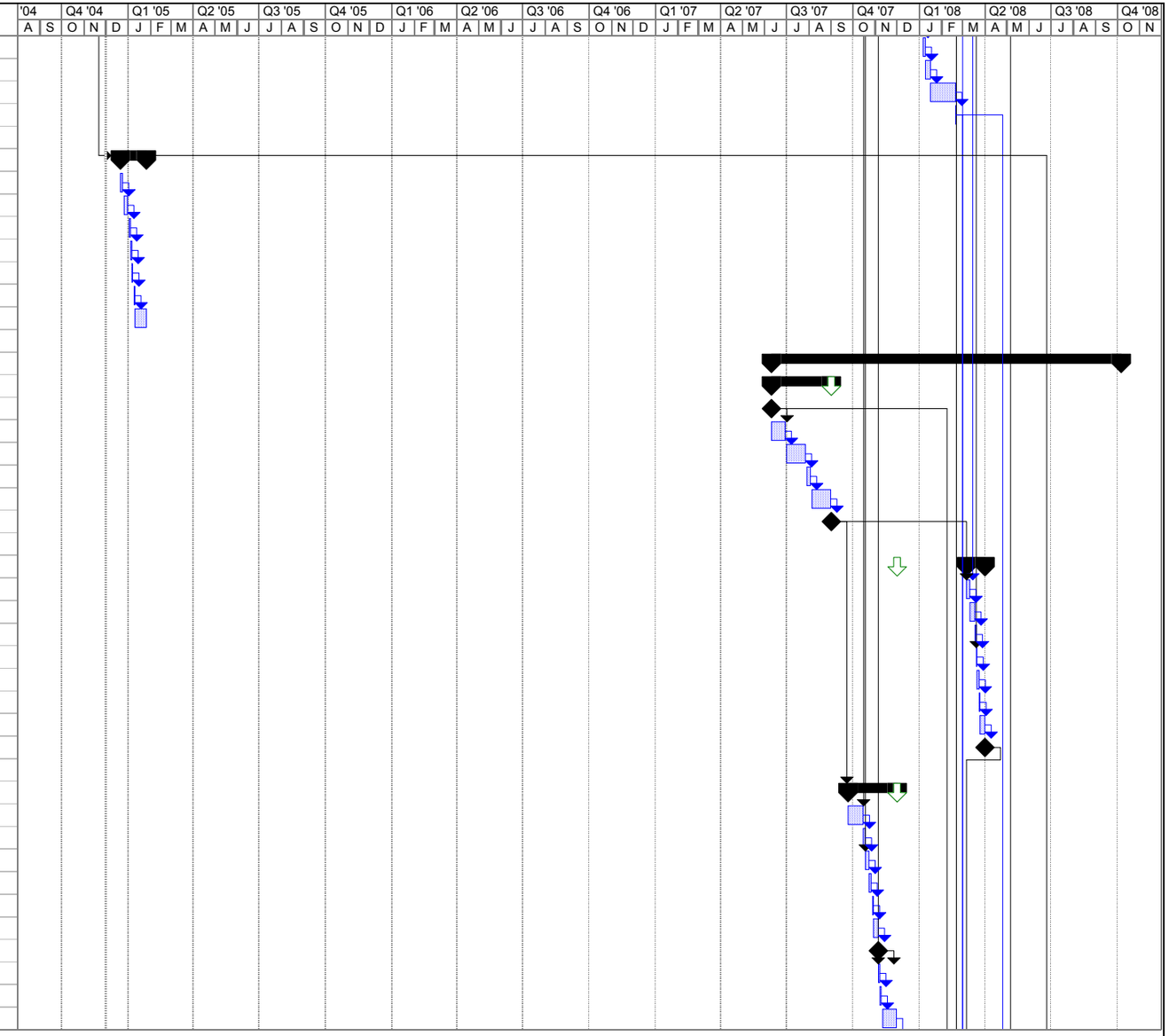
ID	ID	WBS	Task Name	Duration
440	440	AIV_15.3.3.8	Check functionality of sky holography	3 days
441	441	AIV_15.3.3.9	Measure shape vs ZD for both antennas	5 days
442	442	AIV_15.3.3.10	Working margin	25 days
443	443	AIV_15.3.4	Shutdown, stow for transporting	1 day
444	444			
445	**445**	**AIV_15.3.5**	**Antenna 3 total power**	**26 days**
446	446	AIV_15.3.5.15	Confirm nutator throw and performance	3 days
447	447	AIV_15.3.5.16	Measue aO performance; update model	5 days
448	448	AIV_15.3.5.17	Measure beam profile in one bands, fn of elevation	2 days
449	449	AIV_15.3.5.18	Measure optical and radio pointing, tracking	2 days
450	450	AIV_15.3.5.20	Confirm safe and linear performance in solar mode	1 day
451	451	AIV_15.3.5.22	Remove OPT	1 day
452	452	AIV_15.3.5.21	Working margin	12 days
453	453			
454	**454**	**AIV_16**	**AOS**	**346 days**
455	**455**	**AIV_16.1**	**Building and infrastructure**	**60 days**
456	456	AIV_16.1.1	Site TB and infrastructure complete	0 days
457	457	AIV_16.1.2	Install computer infrastructure (network, phones)	15 days
458	458	AIV_16.1.3	Install computers, video, etc.	20 days
459	459	AIV_16.1.4	Check out operation of computers, surveillance and access from OSF	5 days
460	460	AIV_16.1.5	Working margin	20 days
461	461	AIV_16.1.6	Handover to ops and SI	0 days
462	462			
463	**463**	**AIV_16.2**	**Central LO and fibre**	**17.5 days**
464	464	AIV_16.2.1	Install Fibre Distribution system in TB	2.5 days
465	465	AIV_16.2.2	Mechanical fit of Central LO in TB	5 days
466	466	AIV_16.2.3	Adjust cooling	2 days
467	467	AIV_16.2.4	Functionality check	1 day
468	468	AIV_16.2.5	Cable up to fibre distribution system	1 day
469	469	AIV_16.2.6	Check fibre power levels to pads	1 day
470	470	AIV_16.2.7	Working margin	5 days
471	471	AIV_16.2.8	Central LO ready for use - 8 stations	0 days
472	472			
473	**473**	**AIV_16.3**	**Correlator**	**49 days**
474	474	AIV_16.3.1	Install correlator bank 1	15 days
475	475	AIV_16.3.2	Power up, check cooling and power	3 days
476	476	AIV_16.3.3	Functional checkout	3 days
477	477	AIV_16.3.4	Check out correlator operation from OSF	3 days
478	478	AIV_16.3.5	Connect correlator to data system	1 day
479	479	AIV_16.3.6	Functional check of correlator and data system	5 days
480	480	AIV_16.3.7	Correlator and data system handed over to SI	0 days
481	481	AIV_16.3.8	Check out transfer of data to OSF	2 days
482	482	AIV_16.3.9	Connect corrlator to fibre distribution system	2 days
483	483	AIV_16.3.10	Working margin	15 days



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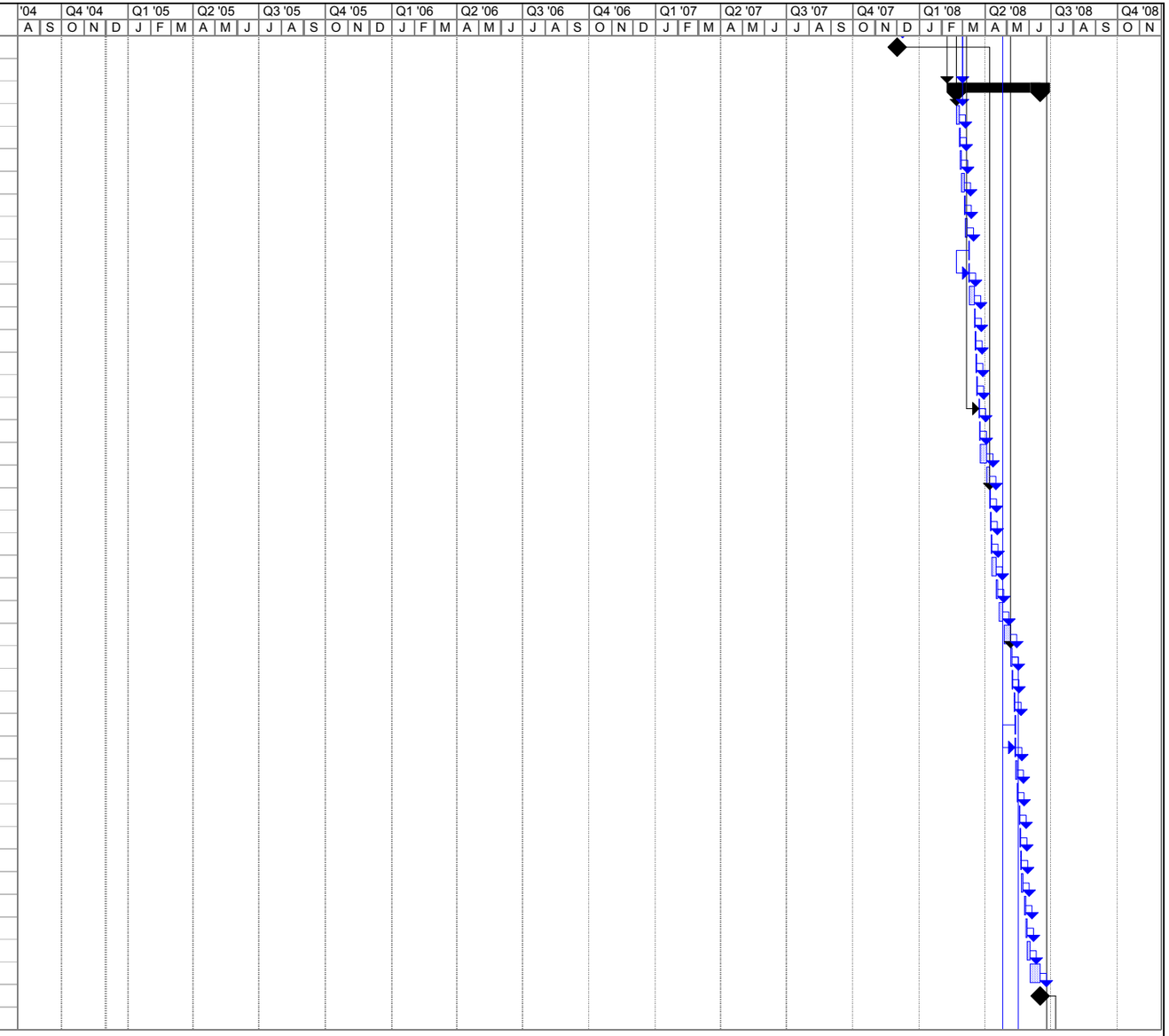
ID	ID	WBS	Task Name	Duration
484	484	AIV_16.3.11	Correlator ready for use	0 days
485	485			
486	**486**	**AIV_16.4**	**Antenna 1 checkout at AOS**	**82 days**
487	487	AIV_16.4.1	Move antenna 1 to ref pad, connect power and data	2 days
488	488	AIV_16.4.2	AOS safety and procedures review	1 day
489	489	AIV_16.4.3	Power on, ACU on, basic checkout script	2 days
490	490	AIV_16.4.4	ABM on, functionality check	2 days
491	491	AIV_16.4.5	Confirm monitor task is tracking health of antenna	1 day
492	492	AIV_16.4.6	Burn in of mechanics and drives: check thermal	3 days
493	493	AIV_16.4.7	Check electrical source impedance (fast switching power)	1 day
494	494	AIV_16.4.8	OPT on, funct check	1 day
495	495	AIV_16.4.9	optical pointing model, tracking test	5 days
496	496	AIV_16.4.10	FE on, func check, start cooling cryostat	1 day
497	497	AIV_16.4.11	Check FE electronic temperature	1 day
498	498	AIV_16.4.12	BE on, local func check	1 day
499	499	AIV_16.4.13	Check BE electronic temperature	1 day
500	500	AIV_16.4.14	Connect BE to LO and check LO operation	1 day
501	501	AIV_16.4.15	Check LO robustness	1 day
502	502	AIV_16.4.16	Working margin for problem resolution	7 days
503	503	AIV_16.4.17	Measure Tsys for each band	2 days
504	504	AIV_16.4.18	Check autocorrelation is functional	1 day
505	505	AIV_16.4.19	Sweep for birdies	1 day
506	506	AIV_16.4.20	Check operation of WVR	1 day
507	507	AIV_16.4.21	Verify amplitude calibration	4 days
508	508	AIV_16.4.22	Measure beam profile (confirm M1 shape and M2 alignment)	2 days
509	509	AIV_16.4.40	Radio pointing and tracking tests	5 days
510	510	AIV_16.4.23	Working margin for problem resolution	7 days
511	511	AIV_16.4.24	Move to Pad 2 (keep Rx cold)	2 days
512	512	AIV_16.4.25	Power on, ACU on, basic checkout script	1 day
513	513	AIV_16.4.26	ABM on, functionality check	1 day
514	514	AIV_16.4.27	Check electrical source impedance (fast switching power)	1 day
515	515	AIV_16.4.28	OPT on, funct check	1 day
516	516	AIV_16.4.29	pointing model	2 days
517	517	AIV_16.4.30	FE on, func check	1 day
518	518	AIV_16.4.31	BE on, local func check	1 day
519	519	AIV_16.4.32	Connect BE to LO and check LO operation	1 day
520	520	AIV_16.4.33	Check LO robustness	1 day
521	521	AIV_16.4.34	Measure beam profile (confirm M1 shape and M2 alignment)	2 days
522	522	AIV_16.4.35	Measure polarization separation	2 days
523	523	AIV_16.4.36	Test fast switching: one band	2 days
524	524	AIV_16.4.37	Test fast switching: two bands	2 days
525	525	AIV_16.4.38	Working margin	10 days
526	526	AIV_16.4.39	Antenna 1 ready	0 days
527	527			



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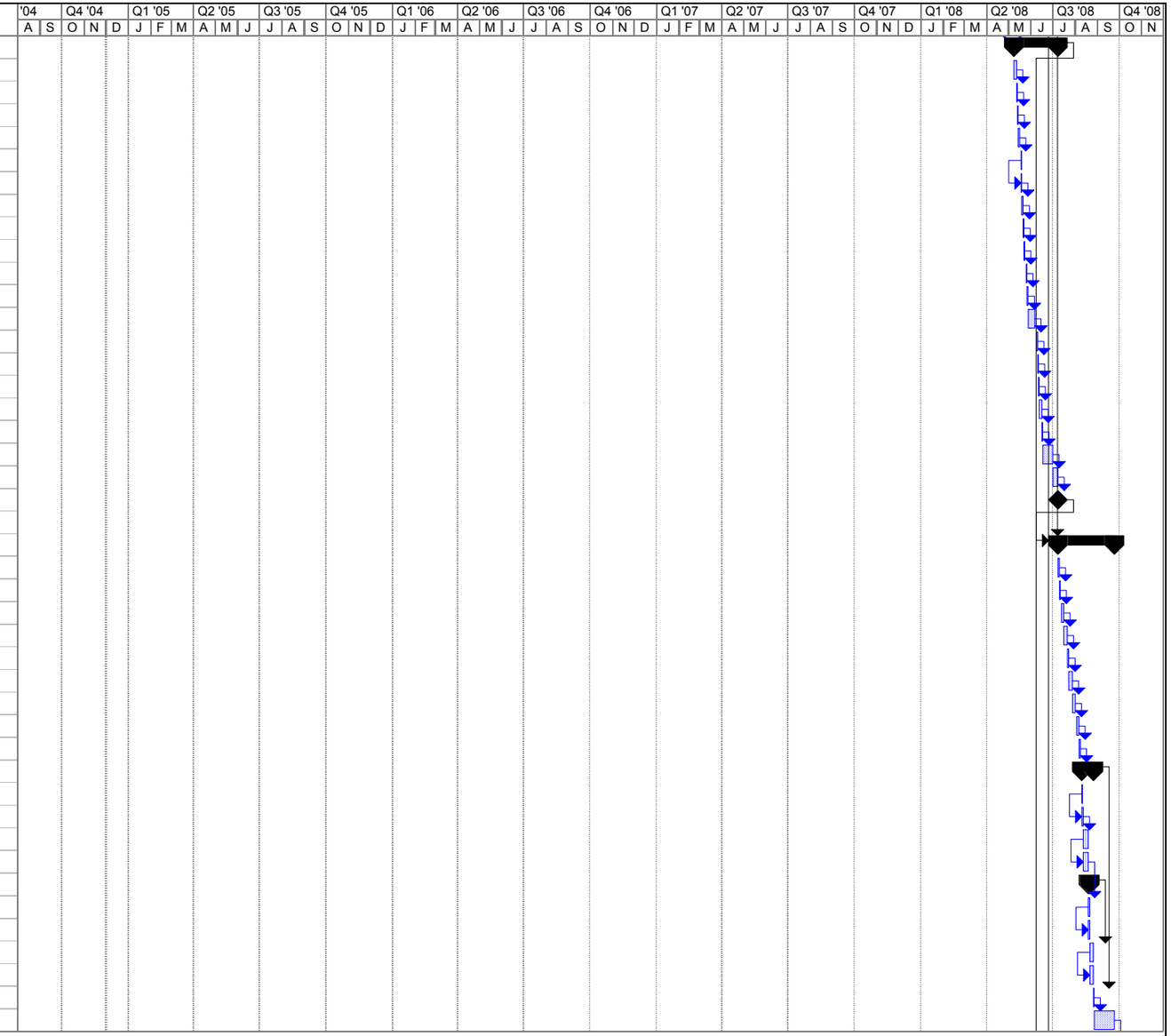
ID	ID	WBS	Task Name	Duration
528	**528**	**AIV_16.5**	**Antenna 2 checkout at AOS**	**43 days**
529	529	AIV_16.5.1	Move antenna 2 to ref pad, connect power and data	2 days
530	530	AIV_16.5.2	Power on, ACU on, basic checkout script	1 day
531	531	AIV_16.5.3	ABM on, functionality check	1 day
532	532	AIV_16.5.4	Burn in of mechanics and drives: check thermal	2 days
533	533	AIV_16.5.5	Check electrical source impedance (fast switching power)	1 day
534	534	AIV_16.5.6	OPT on, funct check	1 day
535	535	AIV_16.5.7	pointing model	2 days
536	536	AIV_16.5.8	FE on, func check, start cooling	1 day
537	537	AIV_16.5.9	BE on, local func check	1 day
538	538	AIV_16.5.10	Connect BE to LO and check LO operation	1 day
539	539	AIV_16.5.11	Check LO robustness	2 days
540	540	AIV_16.5.12	Working margin for problem resolution	7 days
541	541	AIV_16.5.13	Measure Tsys for each band	2 days
542	542	AIV_16.5.14	Sweep for birdies	1 day
543	543	AIV_16.5.15	Check operation of WVR	1 day
544	544	AIV_16.5.16	Amplitude calibration	2 days
545	545	AIV_16.5.17	Measure beam profile (confirm M1 shape and M2 alignment)	1 day
546	546	AIV_16.5.18	Measure surface shape holographically (both antennas)	10 days
547	547	AIV_16.5.19	Working margin	5 days
548	548	AIV_16.5.20	Antenna 2 ready	0 days
549	549			
550	**550**	**AIV_16.6**	**2-element Interferometer verification**	**56 days**
551	551	AIV_16.6.1	Get fringes	2 days
552	552	AIV_16.6.2	Celebrate, even more	1 day
553	553	AIV_16.6.3	Verify LLC and phase tracking	3 days
554	554	AIV_16.6.4	Verify phase switching	3 days
555	555	AIV_16.6.5	Verify coordinated fast switching	2 days
556	556	AIV_16.6.6	Verify WVR operation	3 days
557	557	AIV_16.6.7	measure phase stability for each band	4 days
558	558	AIV_16.6.8	measure amplitude stability for each band	3 days
559	559	AIV_16.6.9	Confirm polarization alignment and separation for each band	2 days
560	**560**	**AIV_16.6.13**	**Antenna Location (Delay) Calibration - Antennas 1-2**	**12 days**
561	561	AIV_16.6.13.2	Bandpass Phase Slope	1 day
562	562	AIV_16.6.13.3	Global Baseline Solution	2 days
563	563	AIV_16.6.13.4	Baseline Stability Test	5 days
564	564	AIV_16.6.13.5	Antenna Delay Measurement	5 days
565	**565**	**AIV_16.6.13.6**	**Interferometry**	**2 days**
566	566	AIV_16.6.13.6.1	Interferometric Pointing	2 days
567	567	AIV_16.6.13.6.2	Interferometric Focus	2 days
568	568	AIV_16.6.13.7	Initial Calibration Verification	3 days
569	569	AIV_16.6.13.8	Tests of WVRs	3 days
570	570	AIV_16.6.10	(check Tech requirements for what needs to be tested)	1 day
571	571	AIV_16.6.11	Working margin	20 days



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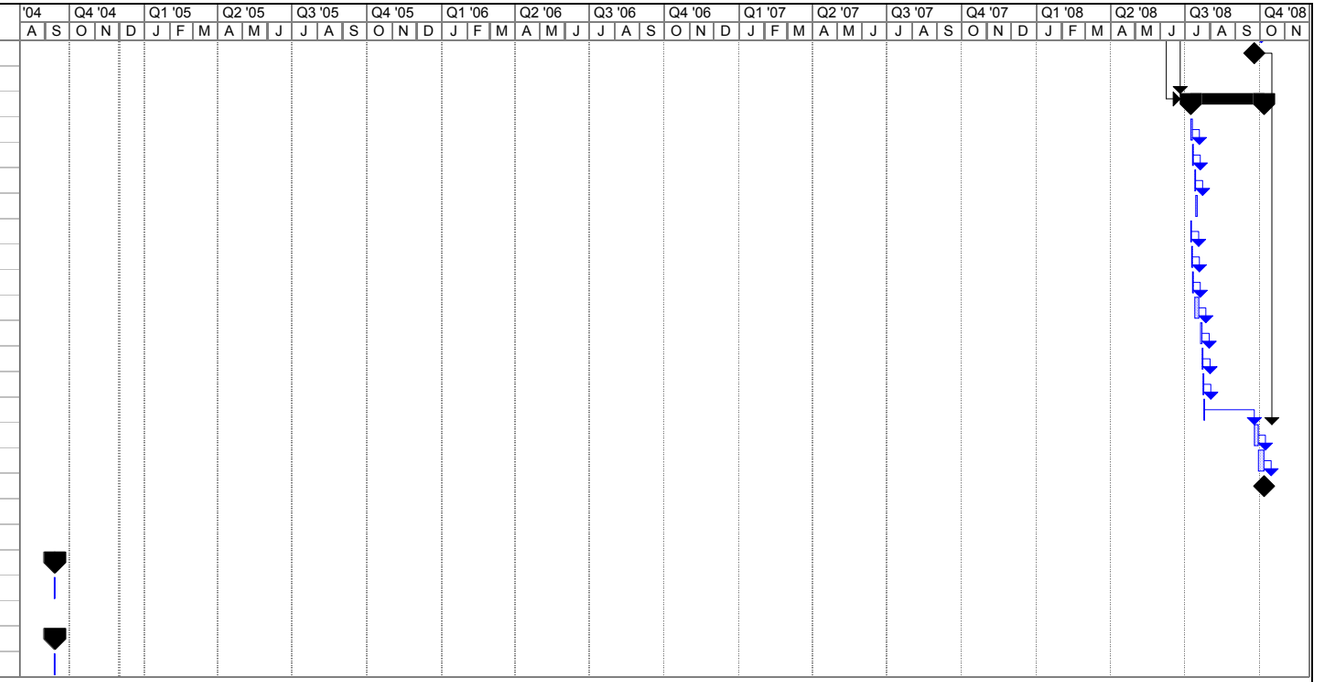
Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Milestone | Rolled Up Progress | Split | External Tasks | Project Summary | External Milestone | Deadline | External Milestone

ID	ID	WBS	Task Name	Duration
572	572	AIV_16.6.12	Two antenna interferometer ready	0 days
573	573			
574	**574**	**AIV_16.7**	**Antenna 3 checkout at AOS**	**64 days**
575	575	AIV_16.7.21	Move antenna 3 to ref pad, connect power and data	2 days
576	576	AIV_16.7.22	Power on, ACU on, basic checkout script	1 day
577	577	AIV_16.7.23	ABM on, functionality check	1 day
578	578	AIV_16.7.24	Burn in of mechanics and drives: check thermal	2 days
579	579	AIV_16.7.28	FE on, func check, start cooling	1 day
580	580	AIV_16.7.29	BE on, local func check	1 day
581	581	AIV_16.7.30	Connect BE to LO and check LO operation	1 day
582	582	AIV_16.7.32	Working margin for problem resolution	5 days
583	583	AIV_16.7.33	Measure Tsys for each band	2 days
584	584	AIV_16.7.35	Check operation of WVR	1 day
585	585	AIV_16.7.36	Amplitude calibration	1 day
586	586	AIV_16.7.37	Measure beam profile (confirm M1 shape and M2 alignment)	1 day
587	587	AIV_16.7.38	Measure surface shape holographically (two antennas)	3 days
588	588	AIV_16.7.39	Working margin	5 days
589	589	AIV_16.7.40	Antenna 3 ready	0 days
590	590			
591	591			
592	**592**	**AIV_17**	**Verified antenna on Unknown pad (QA,UP)**	**1 day**
593	593	AIV_17.1	(process here)	1 day
594	594			
595	**595**	**AIV_18**	**Unverified antenna on Verified pad (UA,QP)**	**1 day**
596	596	AIV_18.1	(process here)	1 day



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