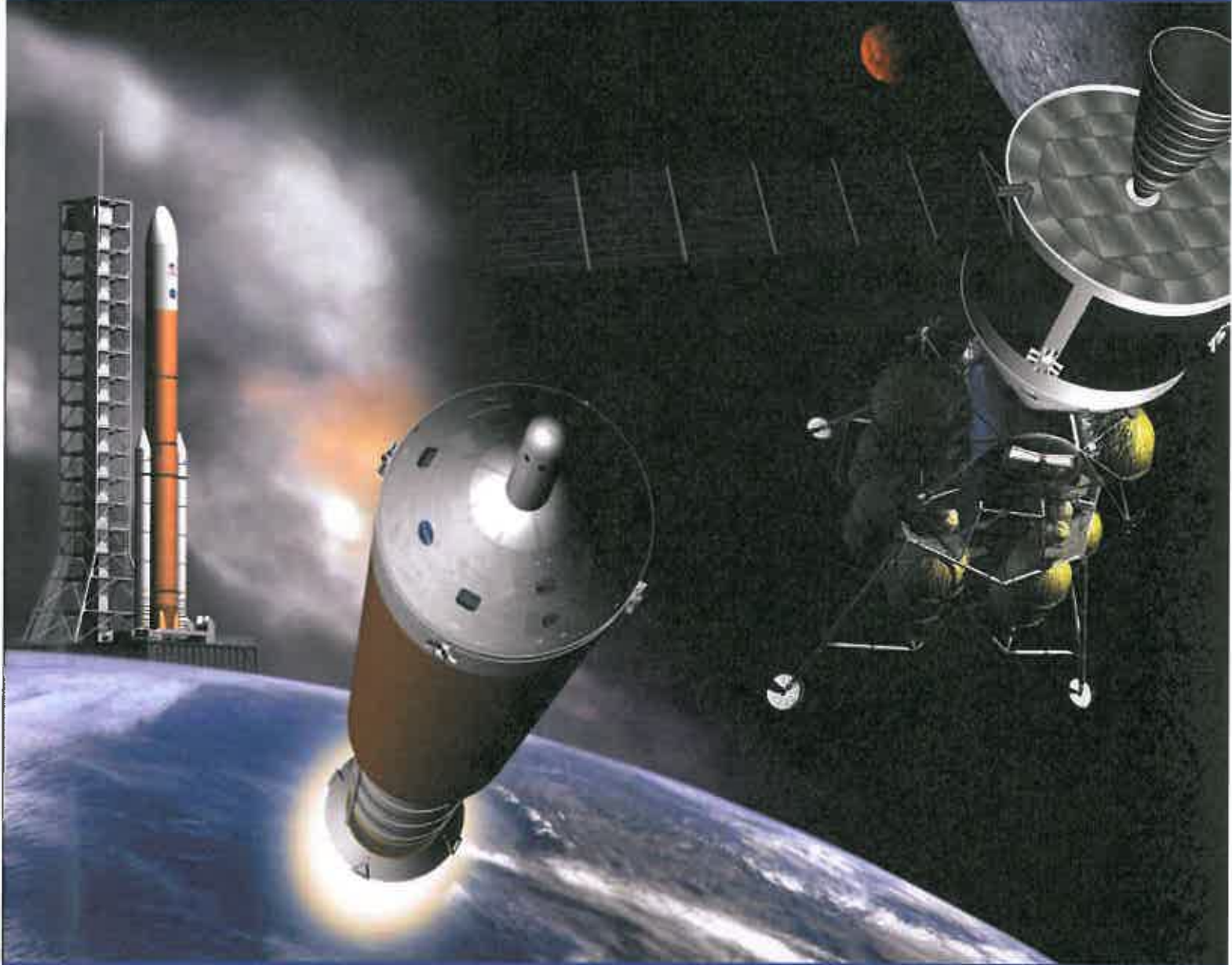




NASA's Exploration Systems Architecture Study



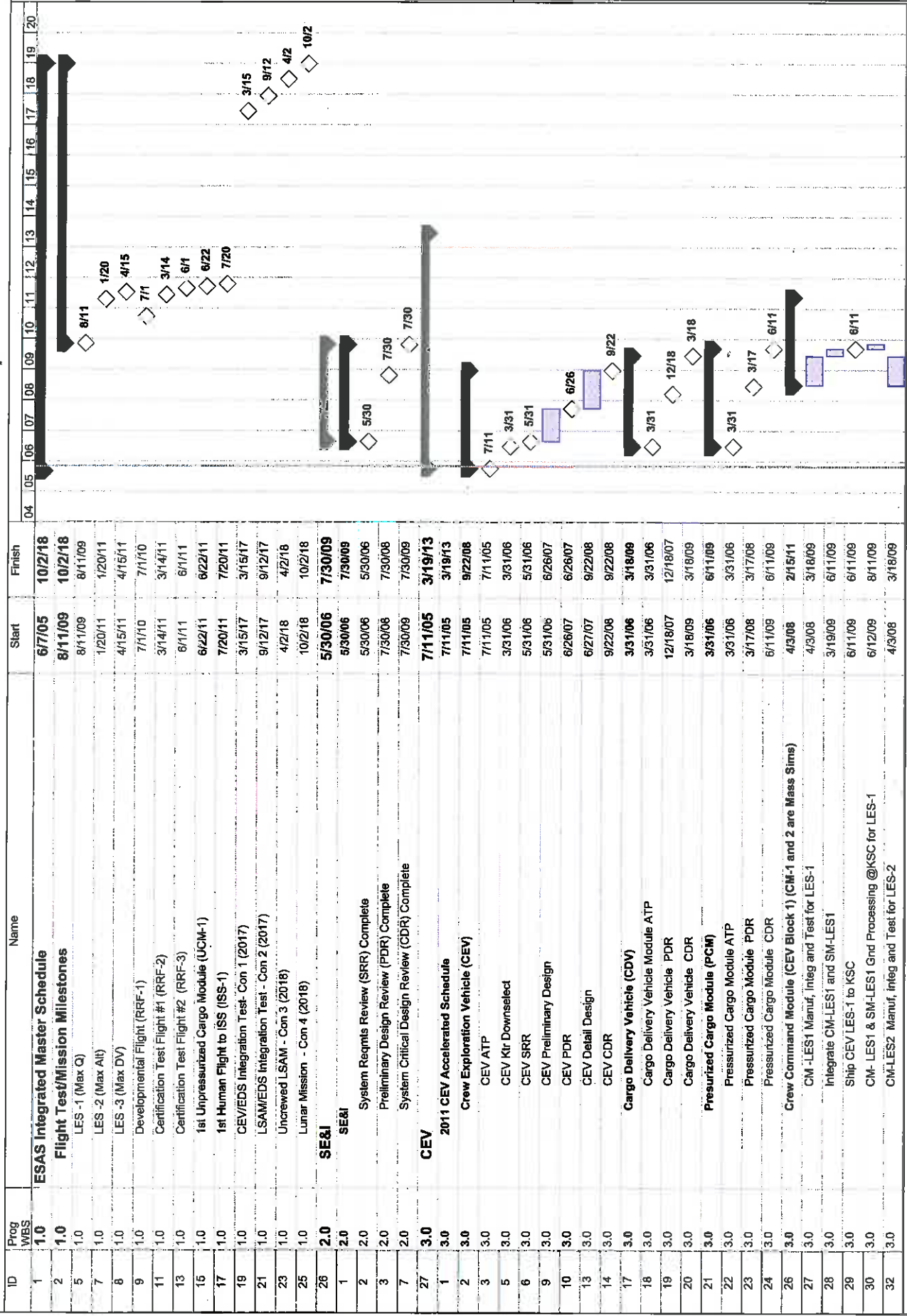
Appendices - Section 11



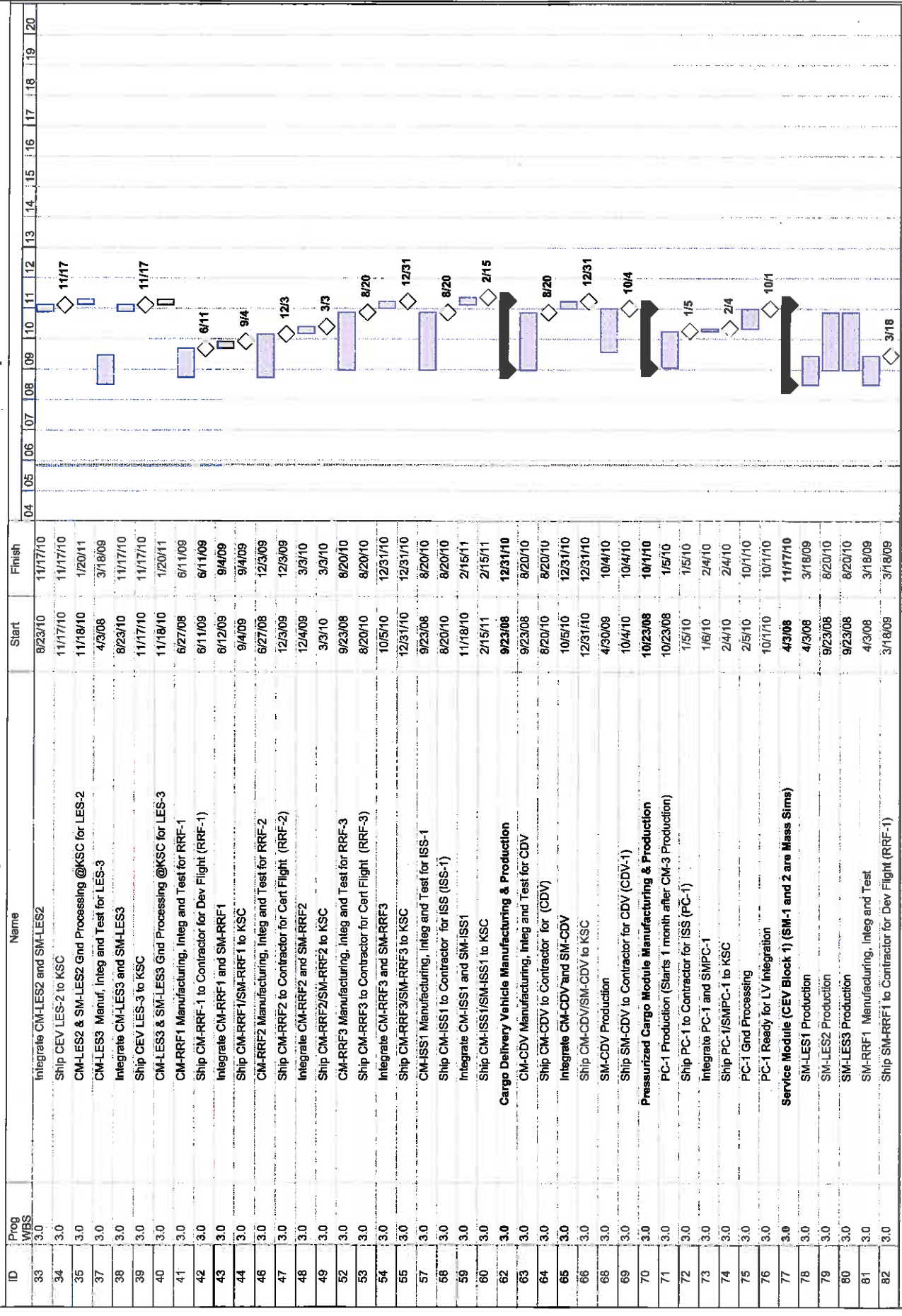
Section 11A

ESAS Integrated Master Schedule

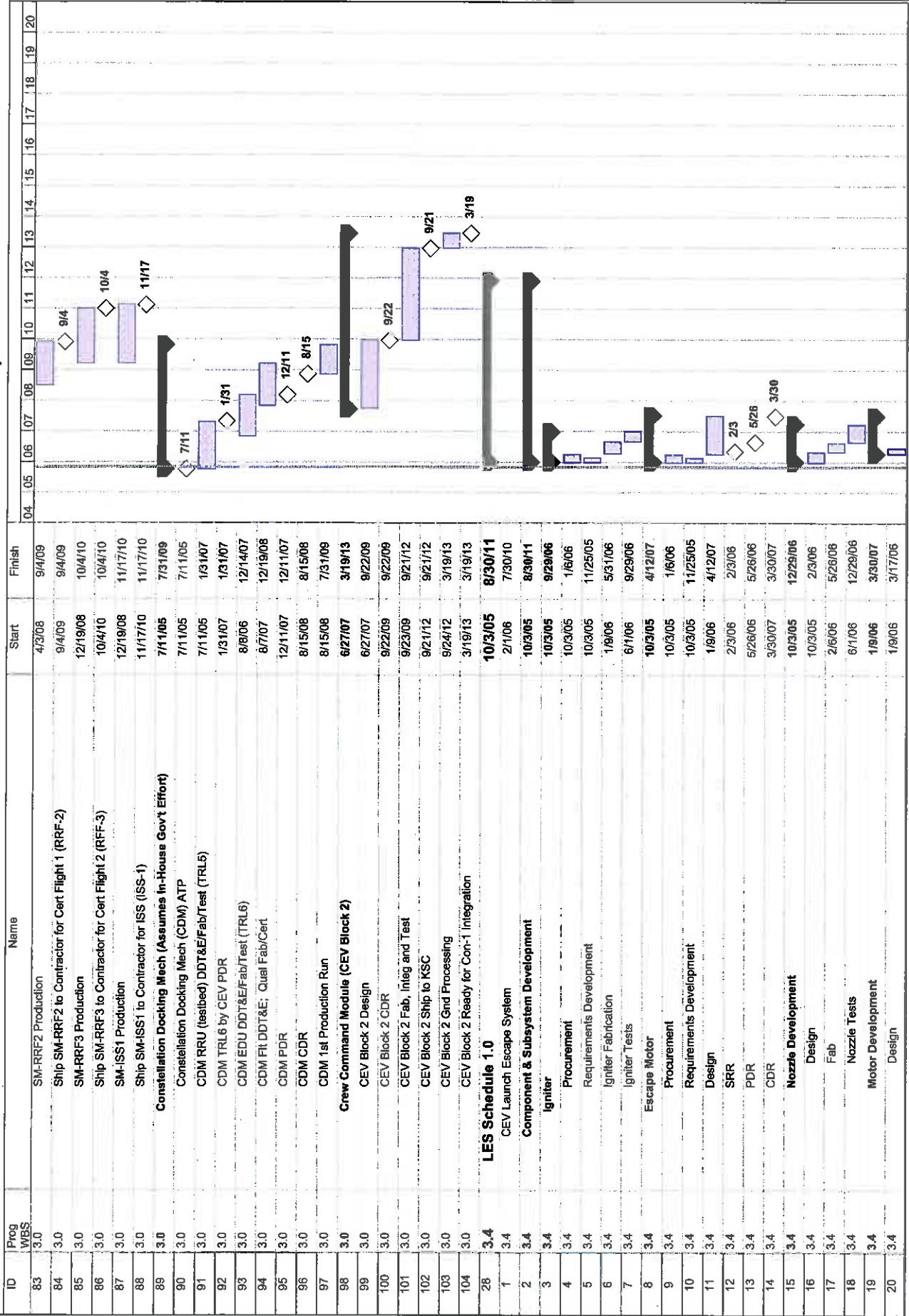
ESAS Integrated Master Schedule - 1.5 Launch Option



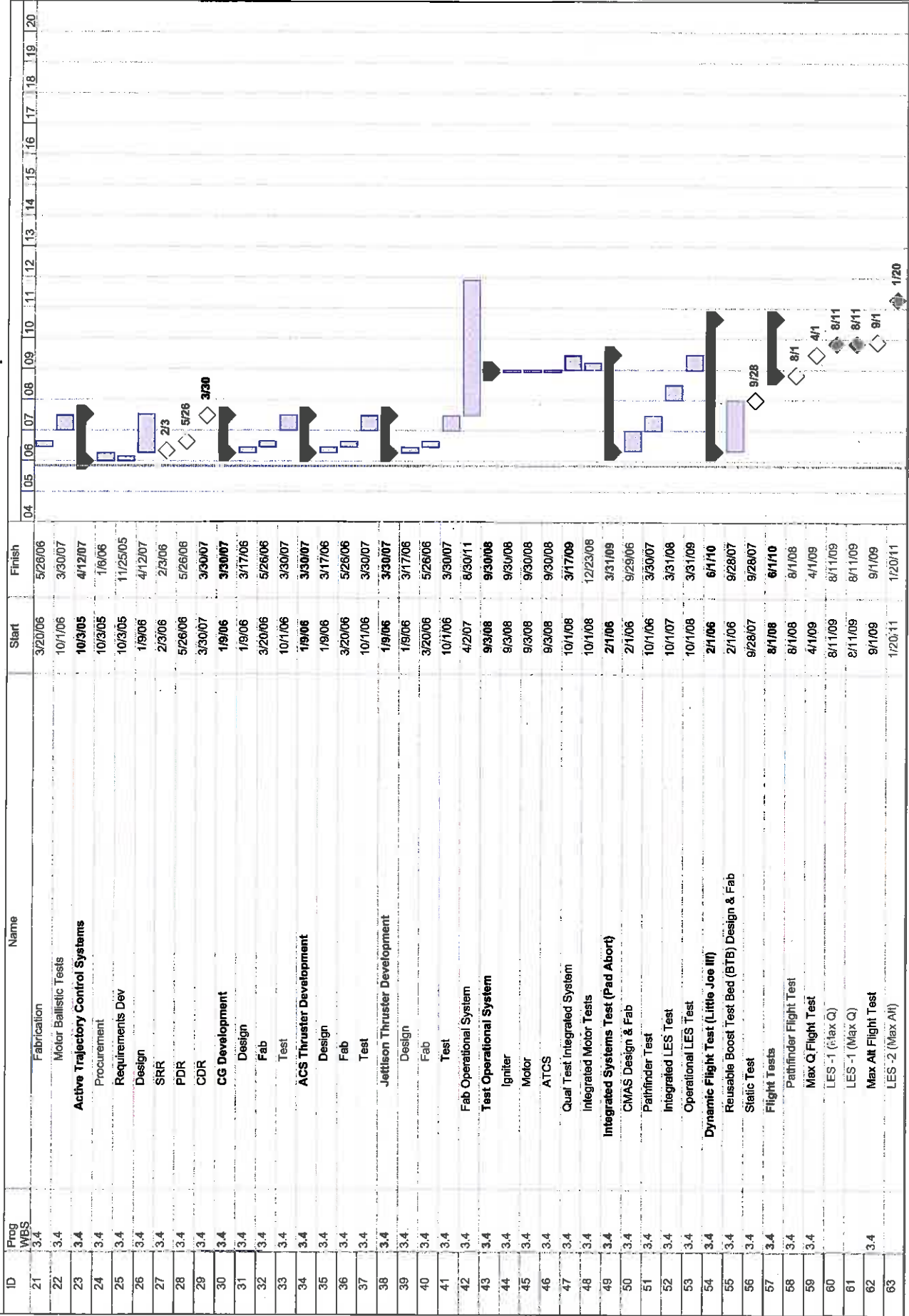
ESAS Integrated Master Schedule - 1.5 Launch Option



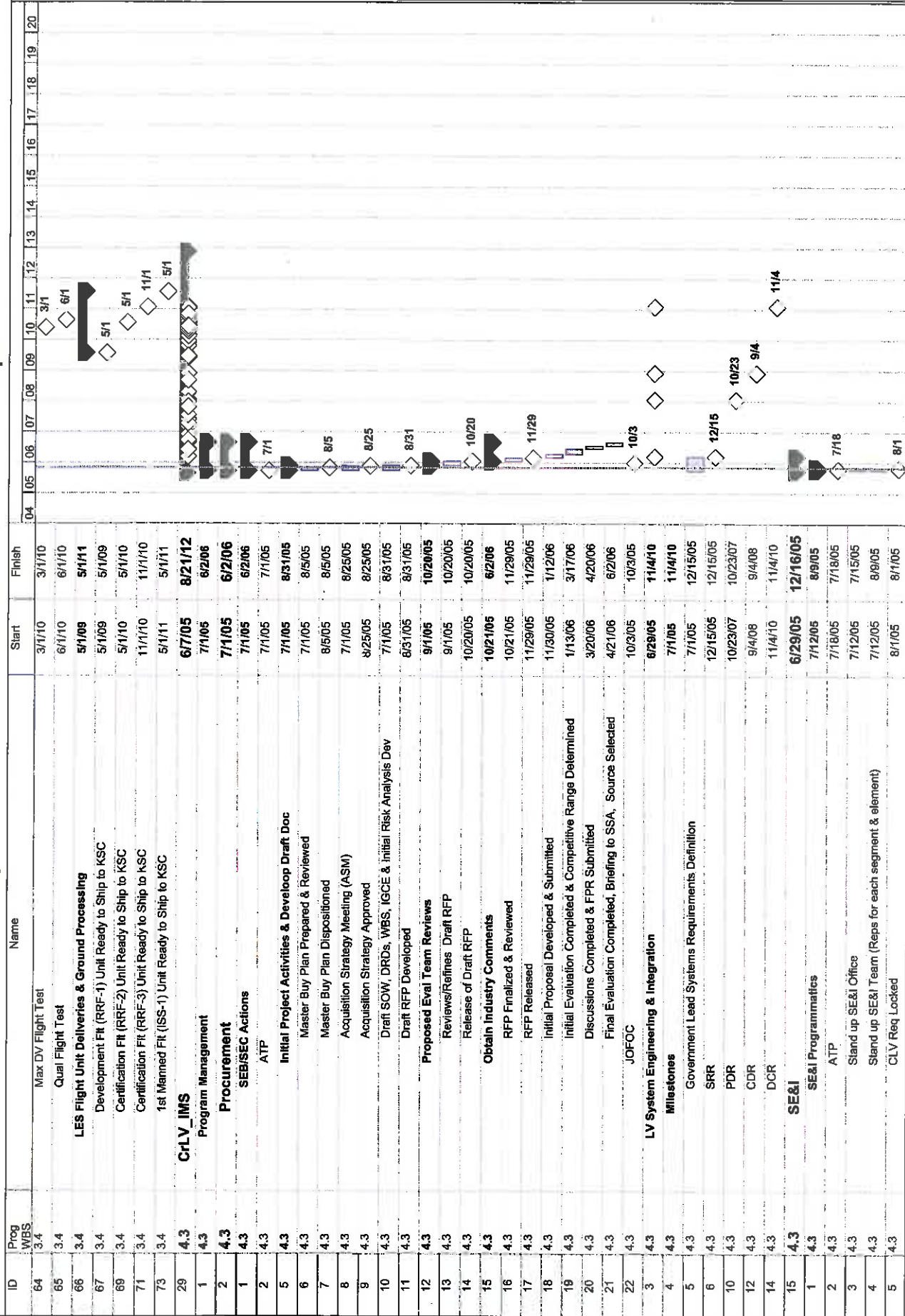
ESAS Integrated Master Schedule - 1.5 Launch Option



ESAS Integrated Master Schedule - 1.5 Launch Option



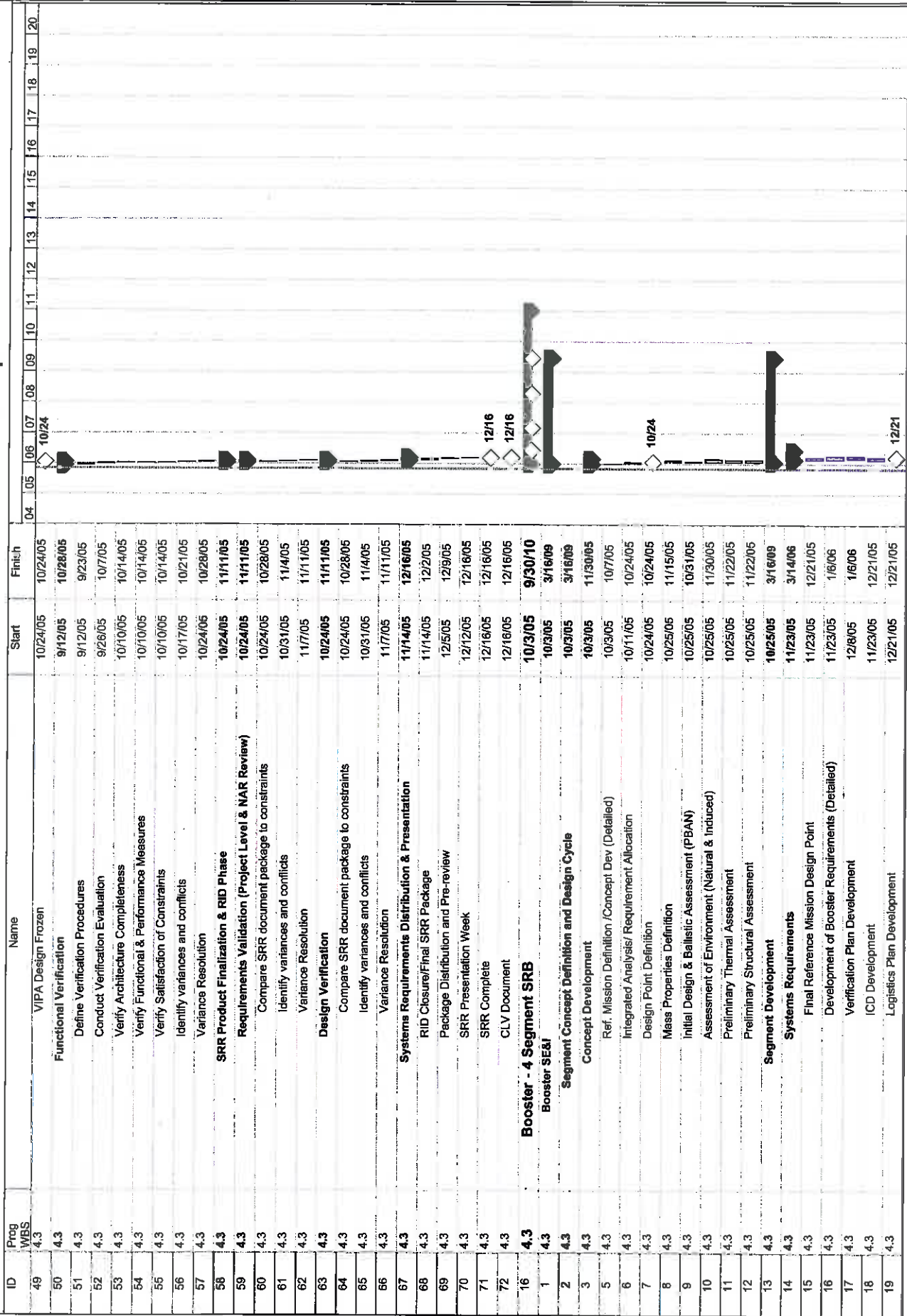
ESAS Integrated Master Schedule - 1.5 Launch Option



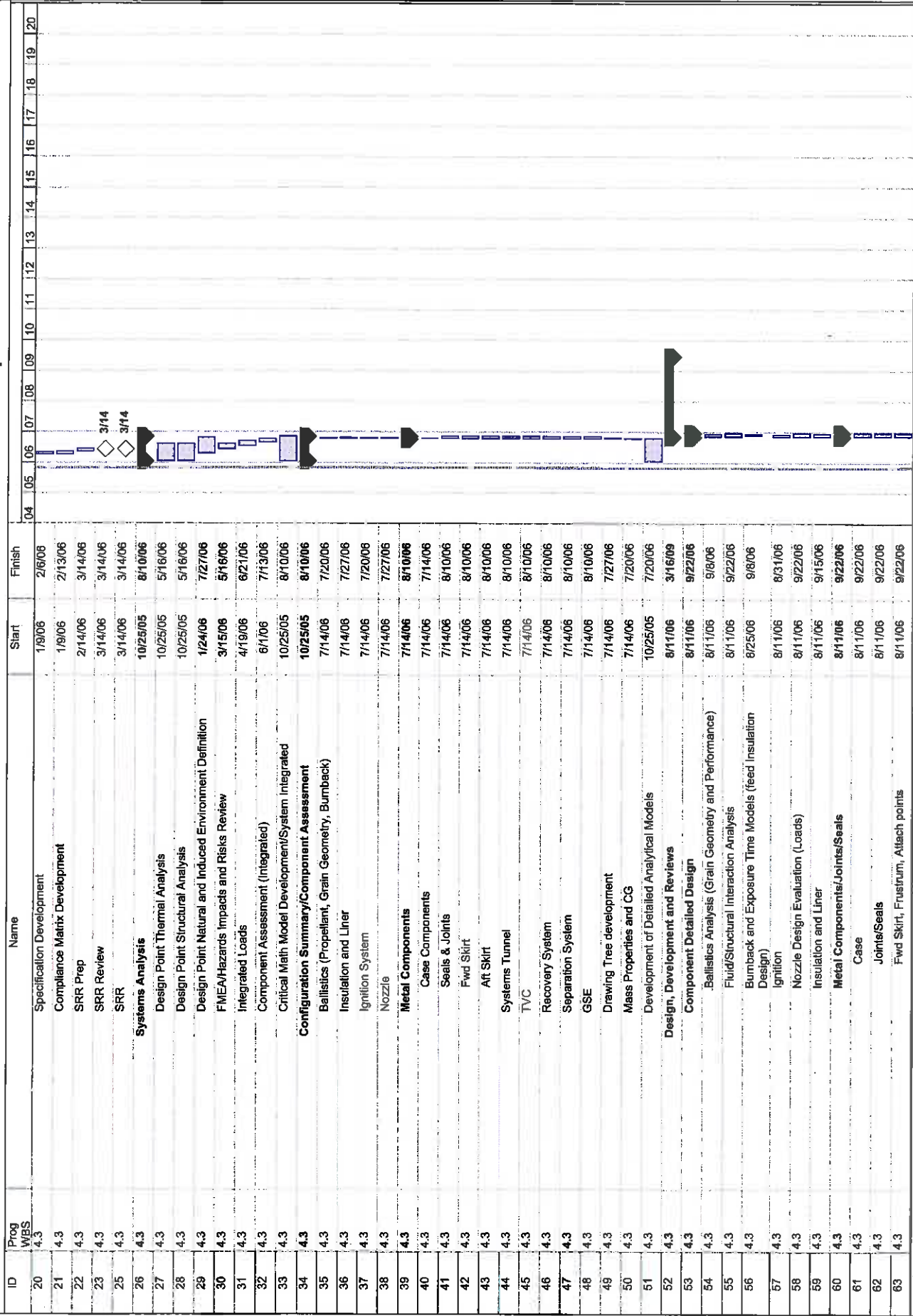
ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish
6	4.3	SRR Logistics	7/18/05	10/21/05
7	4.3	SRR Package Templates	7/18/05	7/29/05
8	4.3	Cradle	8/1/05	8/5/05
9	4.3	Development of Human Rating Plan	7/25/05	8/22/05
10	4.3	Human Rating Plan Vol. I	8/22/05	8/22/05
11	4.3	Stand up SRR Team/Select RID Captains	8/29/05	8/29/05
12	4.3	Facilities Planning and Selection	9/6/05	9/12/05
13	4.3	Review Team Final	10/3/05	10/21/05
14	4.3	Review Process	10/3/05	10/21/05
15	4.3	SEMI Schedule to SRR	6/29/05	12/16/05
16	4.3	SRR Content Development Phase	6/29/05	10/24/05
17	4.3	Design Verification Planning	6/29/05	8/25/05
18	4.3	Select Design Verification Approach	6/29/05	8/23/05
19	4.3	Define Design Verification Procedures	7/29/05	8/25/05
20	4.3	Establish Design Verification Process	8/25/05	8/25/05
21	4.3	Requirements Analysis (VIPA, ED Support, & SME Team)	7/18/05	8/12/05
22	4.3	Define Internal and external launch vehicle constraints	7/18/05	7/22/05
23	4.3	Define Operational Scenarios	7/25/05	7/29/05
24	4.3	Define Measures of Effectiveness	7/25/05	7/29/05
25	4.3	Define Interface Requirements	8/1/05	8/5/05
26	4.3	Define Environments	8/1/05	8/5/05
27	4.3	Validate Performance Requirements (VIPA)	8/8/05	8/12/05
28	4.3	Define Functional Requirements (VIPA)	8/8/05	8/12/05
29	4.3	Functional Analysis (VIPA, ED Support, & SME Team)	8/15/05	9/16/05
30	4.3	Analyze Functional Behaviors	8/15/05	8/19/05
31	4.3	Define Functional Interfaces	8/15/05	8/19/05
32	4.3	Allocate Performance Requirements	8/15/05	8/19/05
33	4.3	Define Mode of Operations	8/22/05	8/26/05
34	4.3	Define Technical Performance Measures	8/22/05	8/26/05
35	4.3	Define Design Characteristics	8/22/05	8/26/05
36	4.3	Define Subfunctions, States, and Modes	8/29/05	9/2/05
37	4.3	Define Functional Timeliness	9/5/05	9/9/05
38	4.3	Define Data & Control Flow	9/12/05	9/16/05
39	4.3	Define Function Failure Modes & Effect	9/12/05	9/16/05
40	4.3	Define Safety Monitoring Functions	9/12/05	9/16/05
41	4.3	Design Completion & Data Capture	8/15/05	10/24/05
42	4.3	Assess Safety & Environmental Hazards	8/15/05	9/2/05
43	4.3	Assess Technology Requirements	8/15/05	9/2/05
44	4.3	Define Design & Performance Characteristics	9/5/05	9/23/05
45	4.3	Define Physical Interfaces	9/5/05	9/23/05
46	4.3	Develop Modelic & Fabricate Prototypes	9/26/05	10/14/05
47	4.3	Assess Functional Failure Modes, Effects & Criticality	9/26/05	10/14/05
48	4.3	Assess Testability Needs	9/26/05	10/14/05

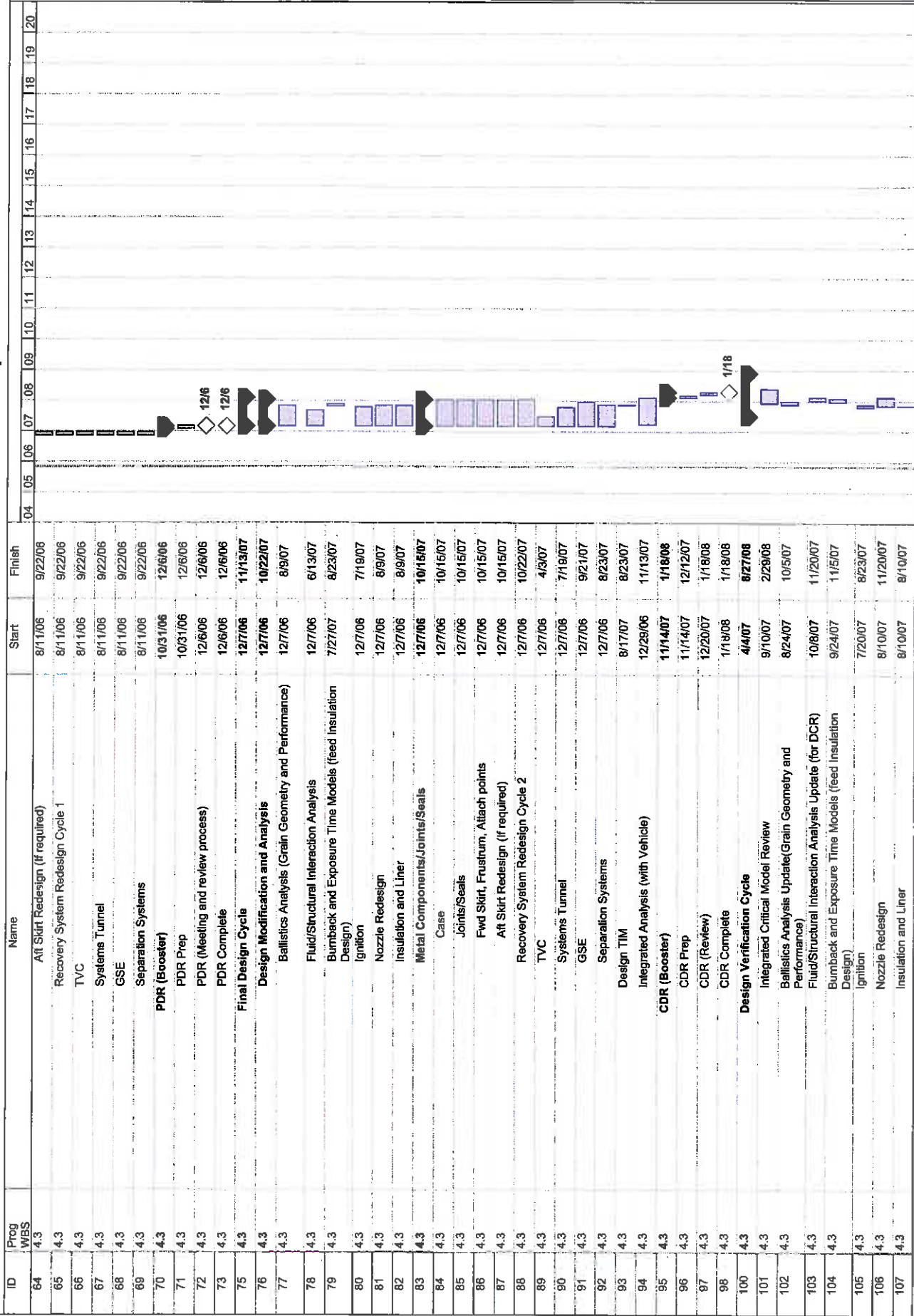
ESAS Integrated Master Schedule - 1.5 Launch Option



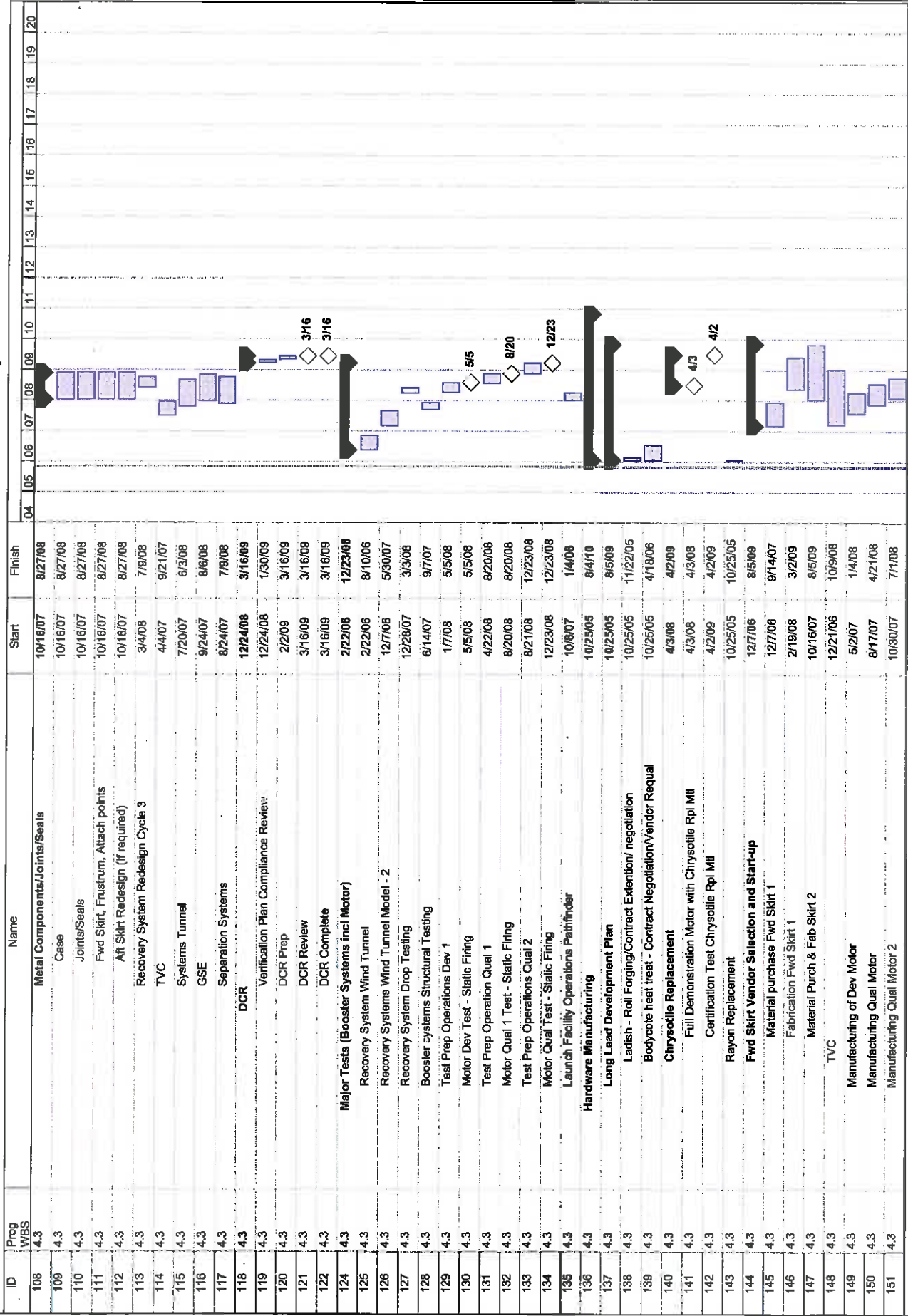
ESAS Integrated Master Schedule - 1.5 Launch Option



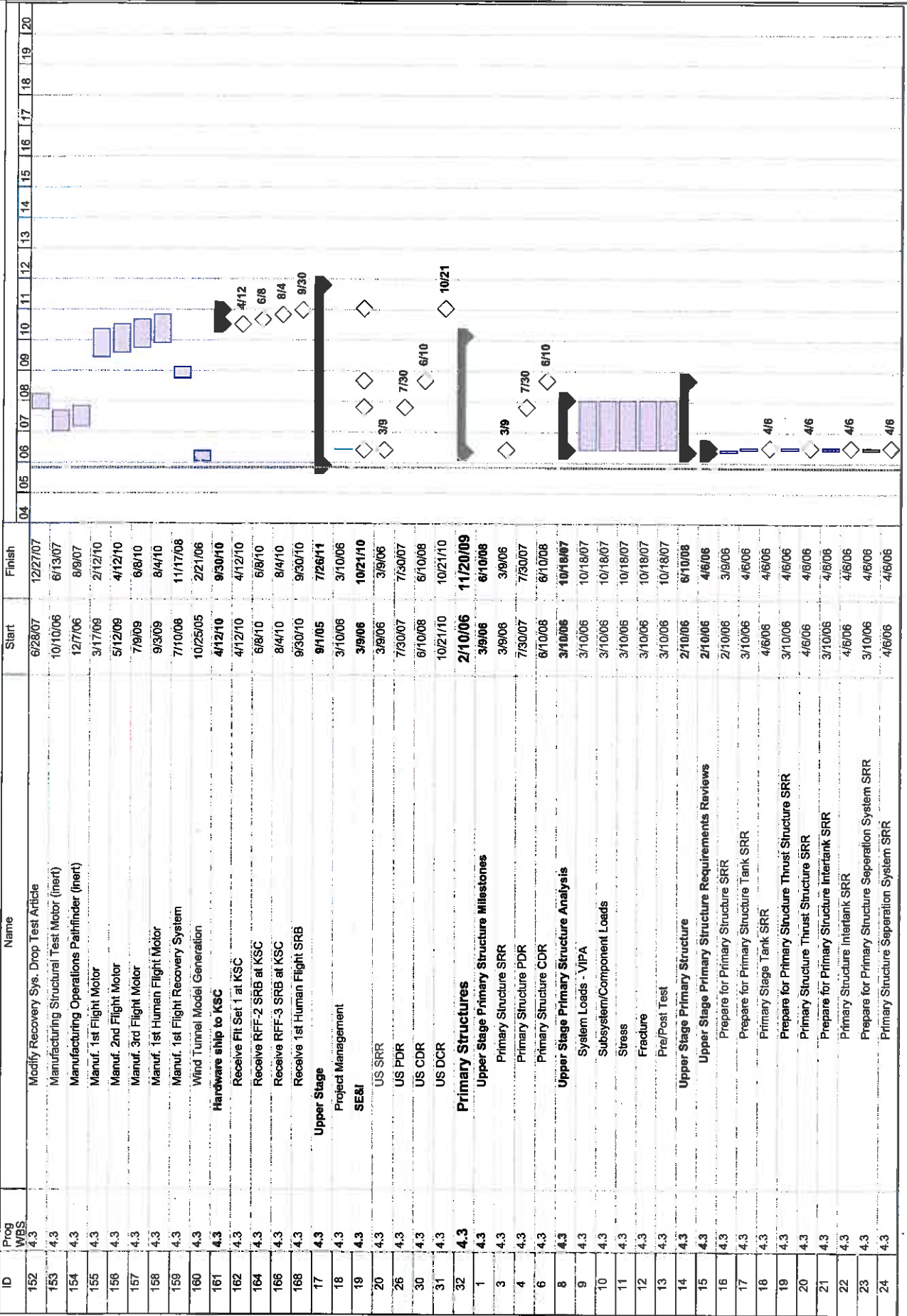
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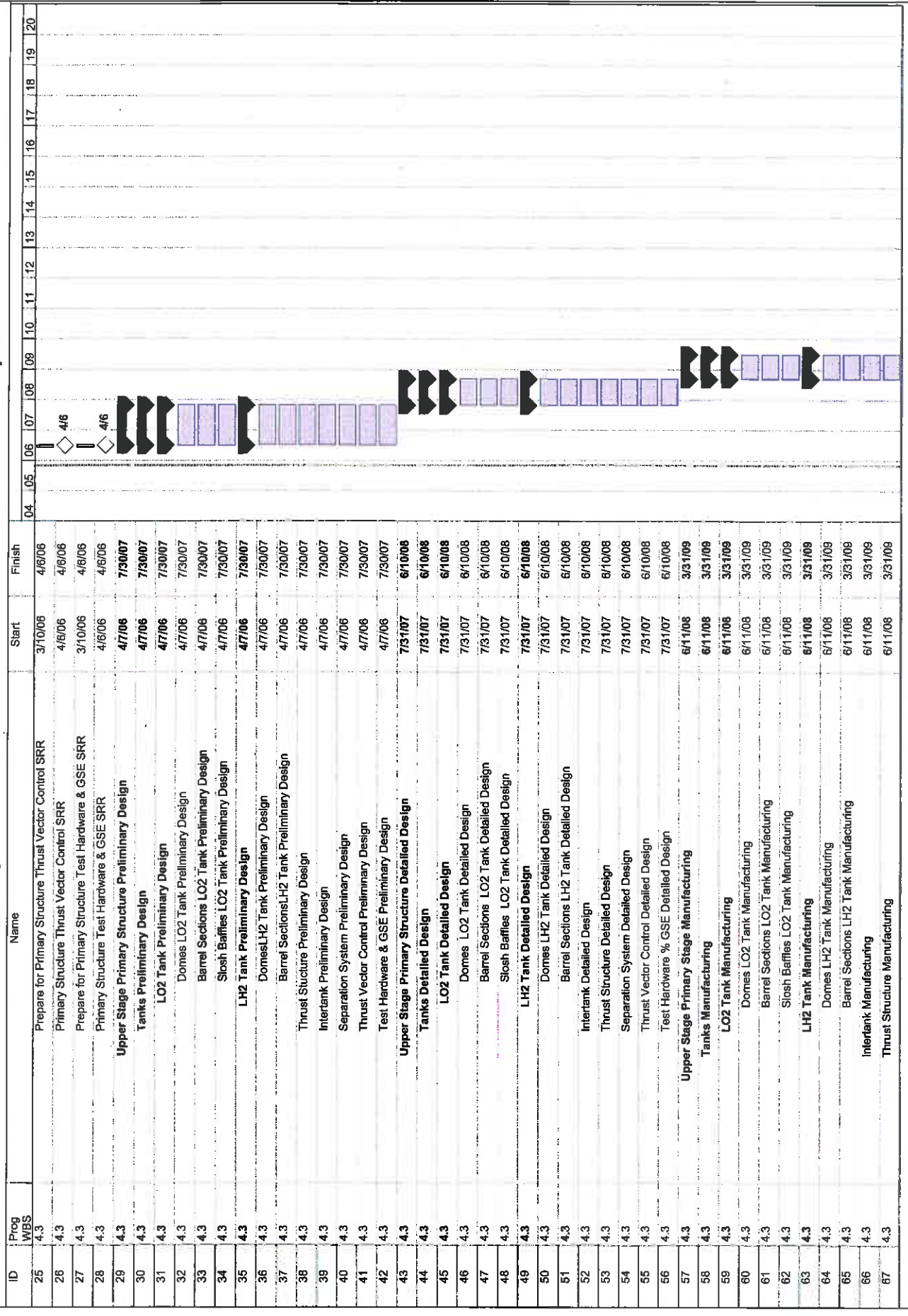
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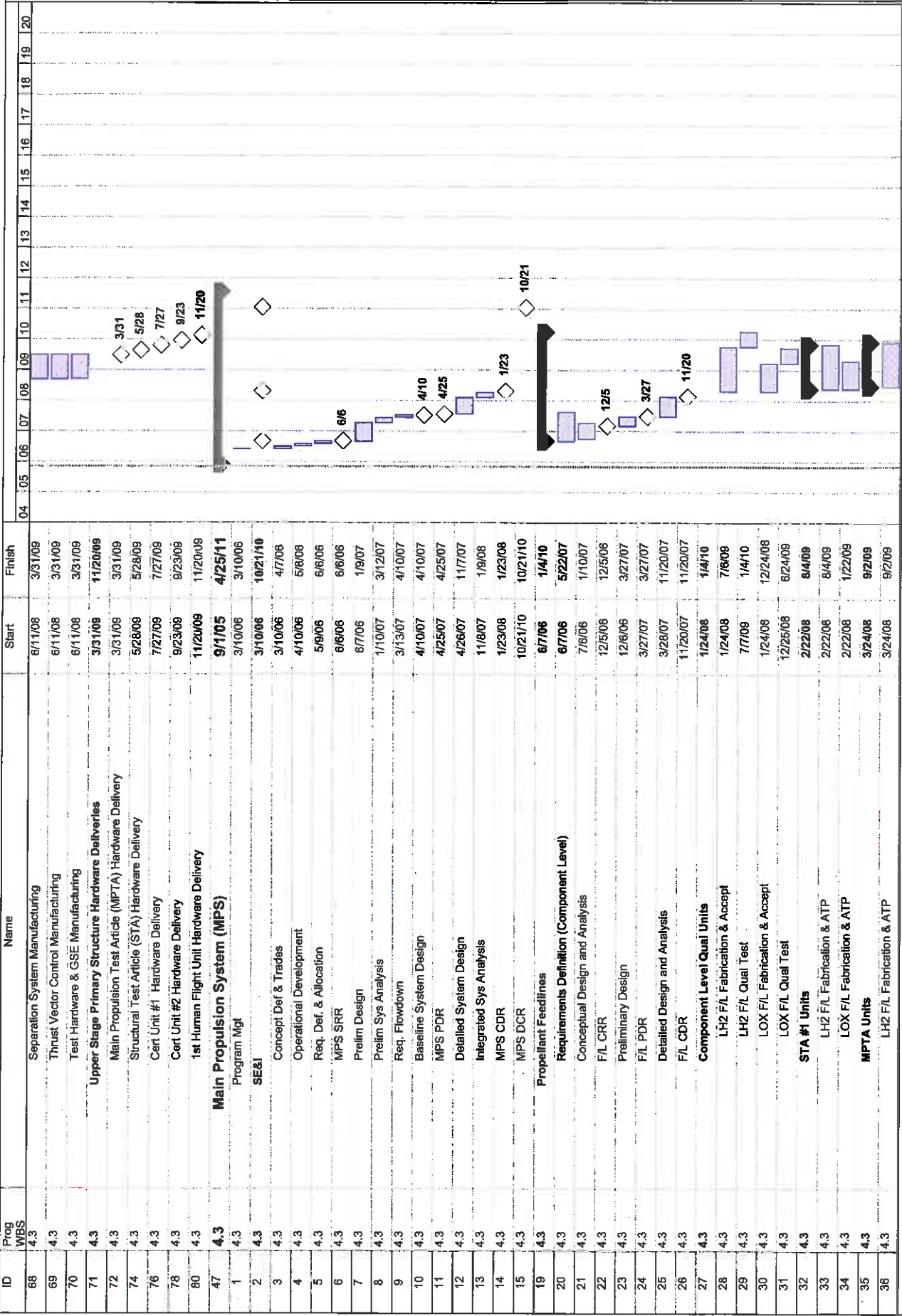
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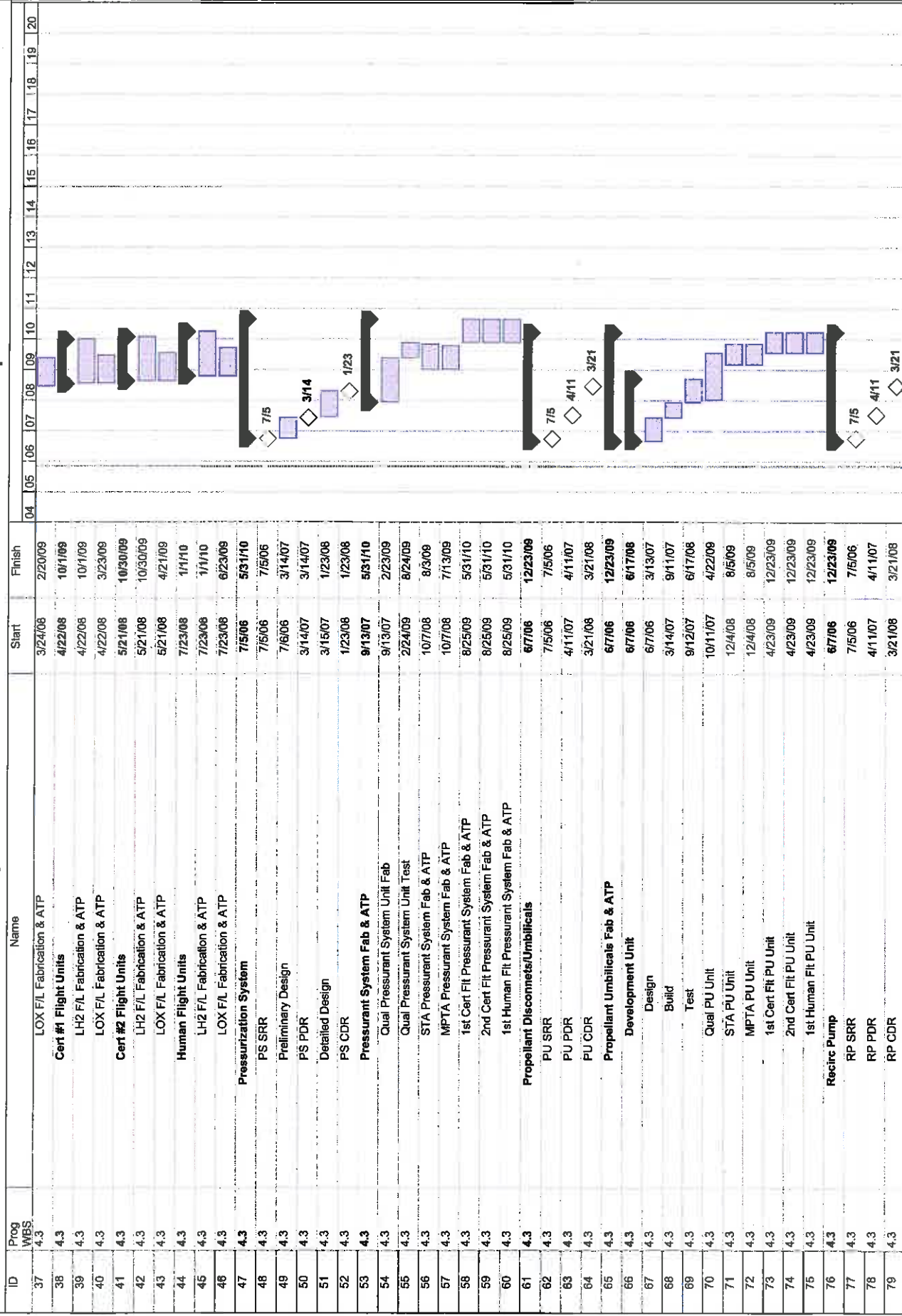
ESAS Integrated Master Schedule - 1.5 Launch Option



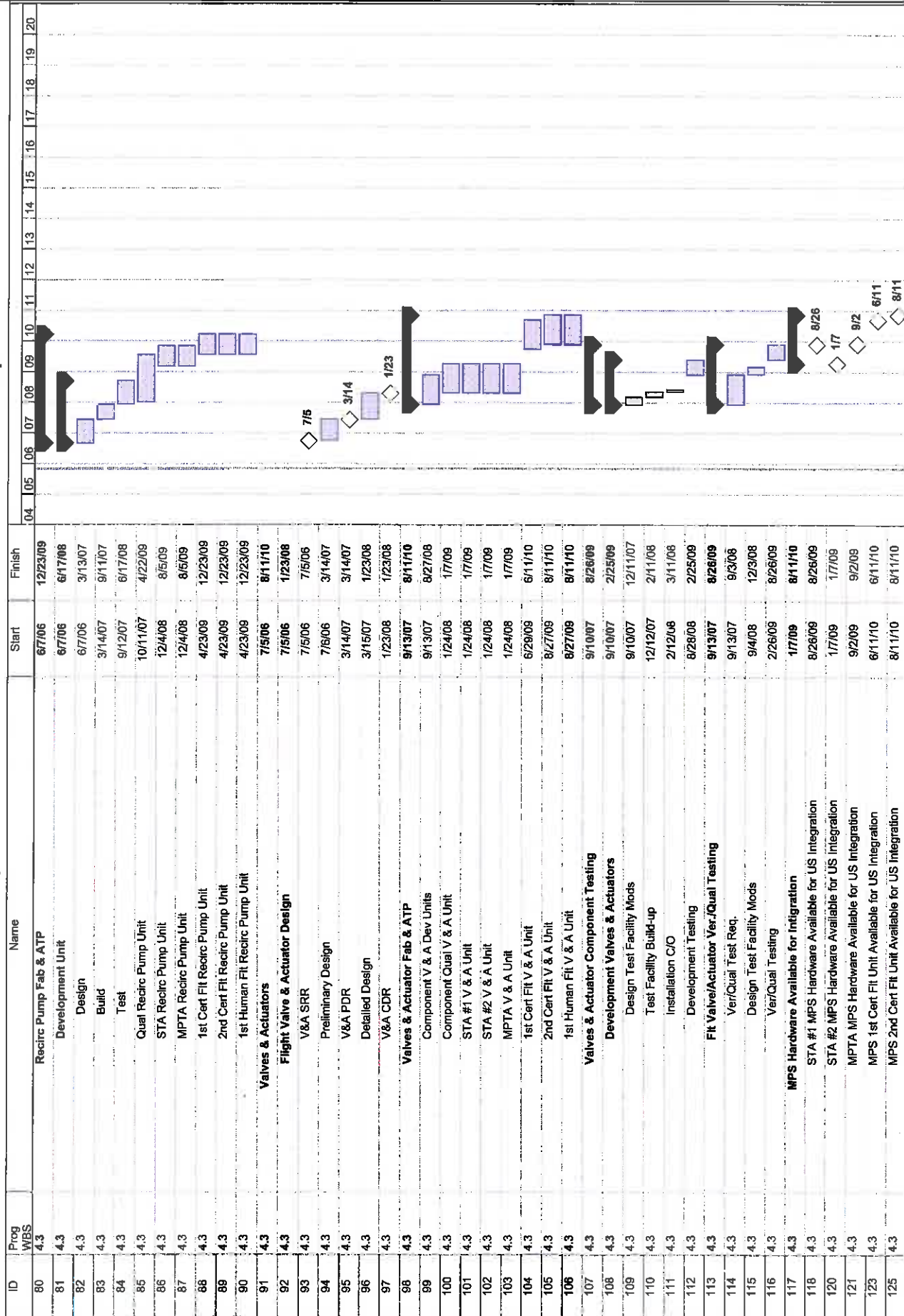
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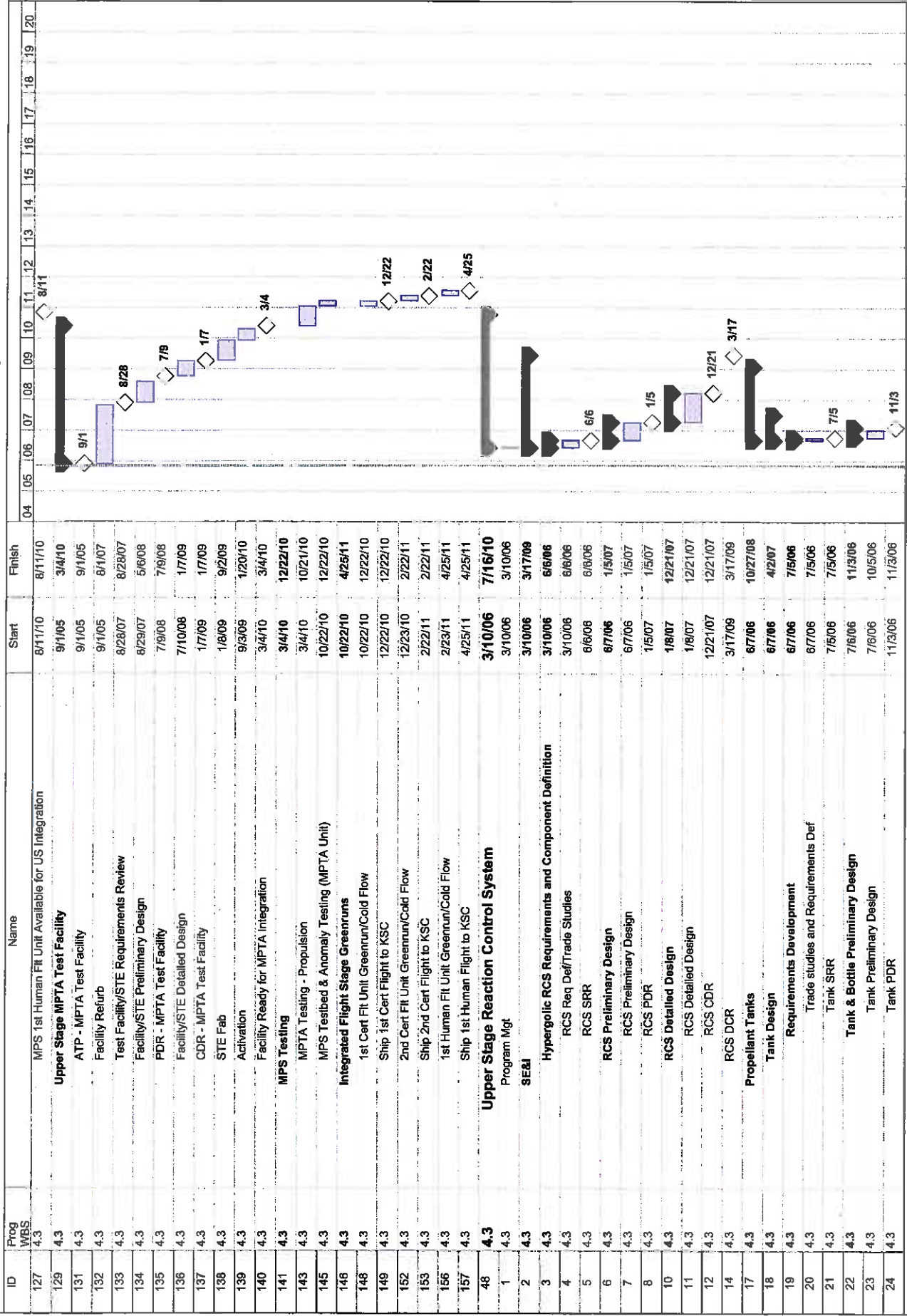
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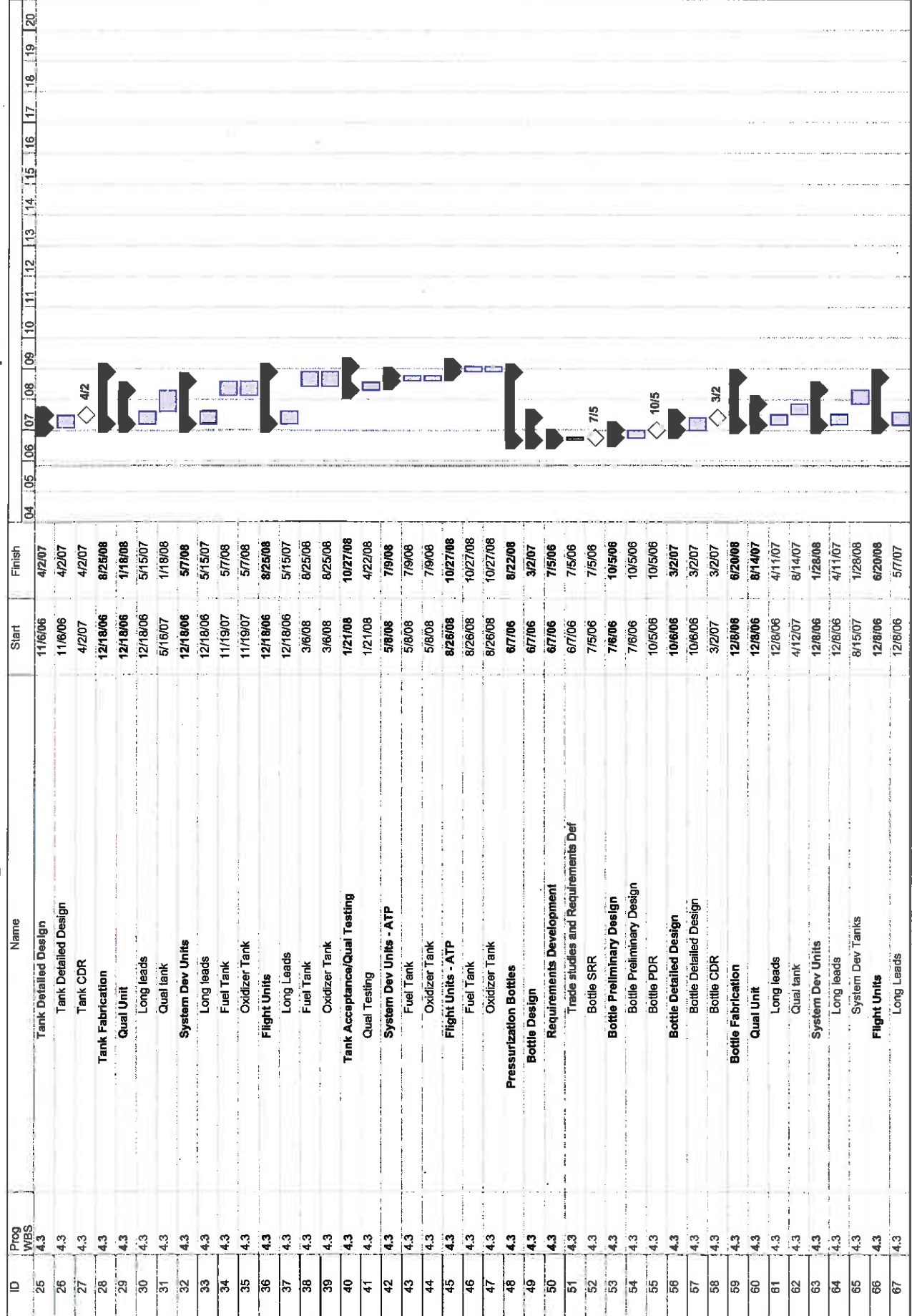
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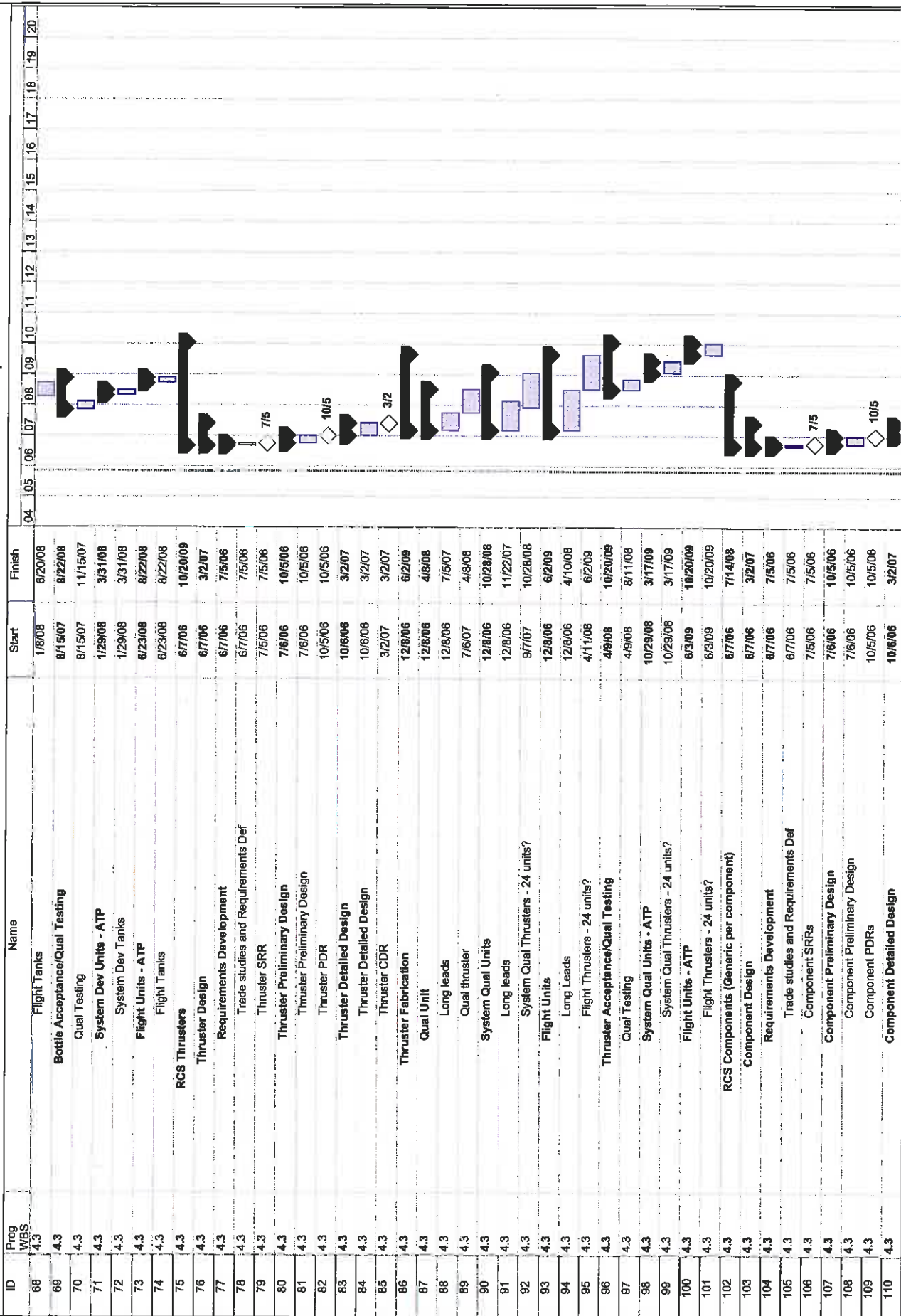
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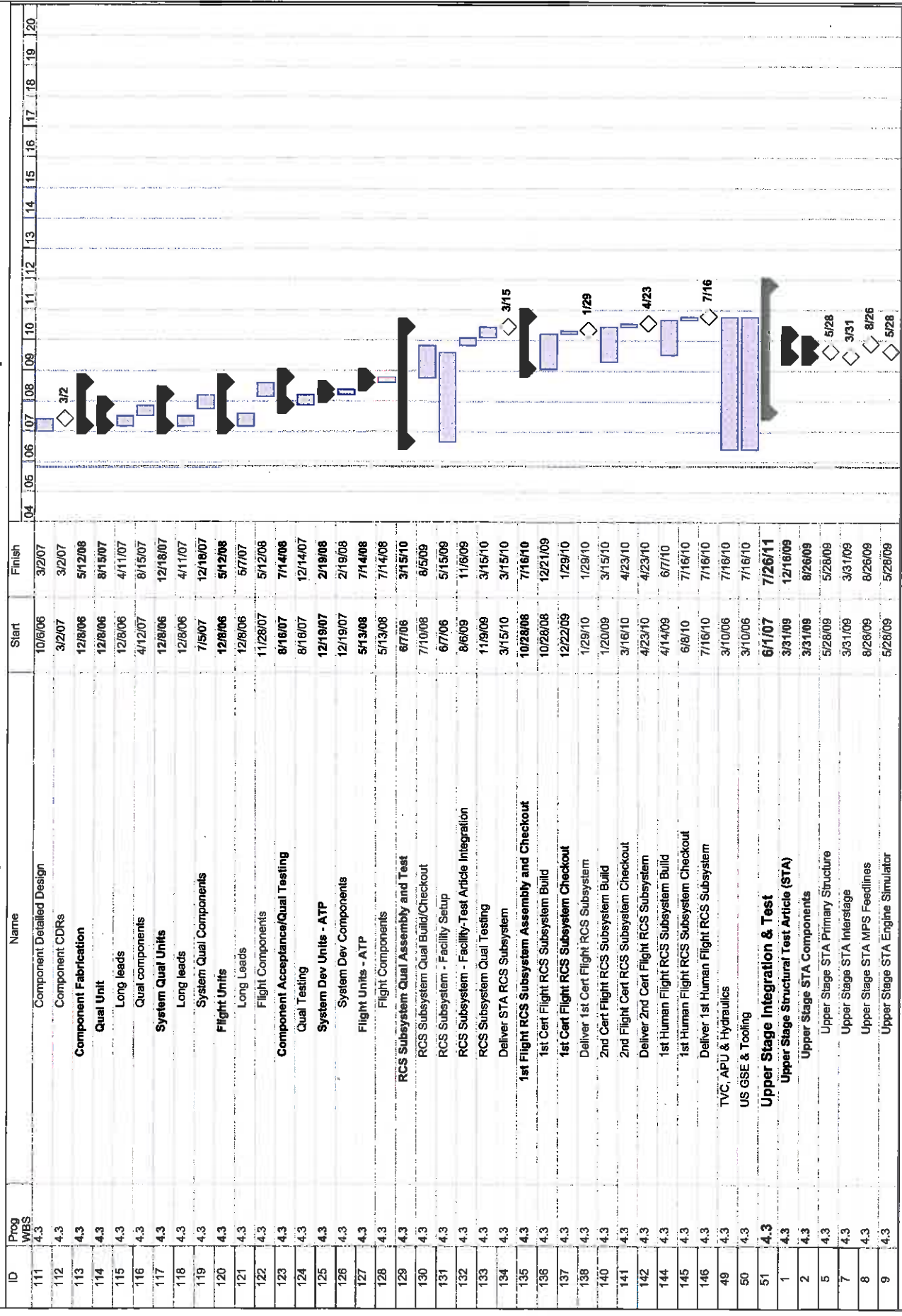
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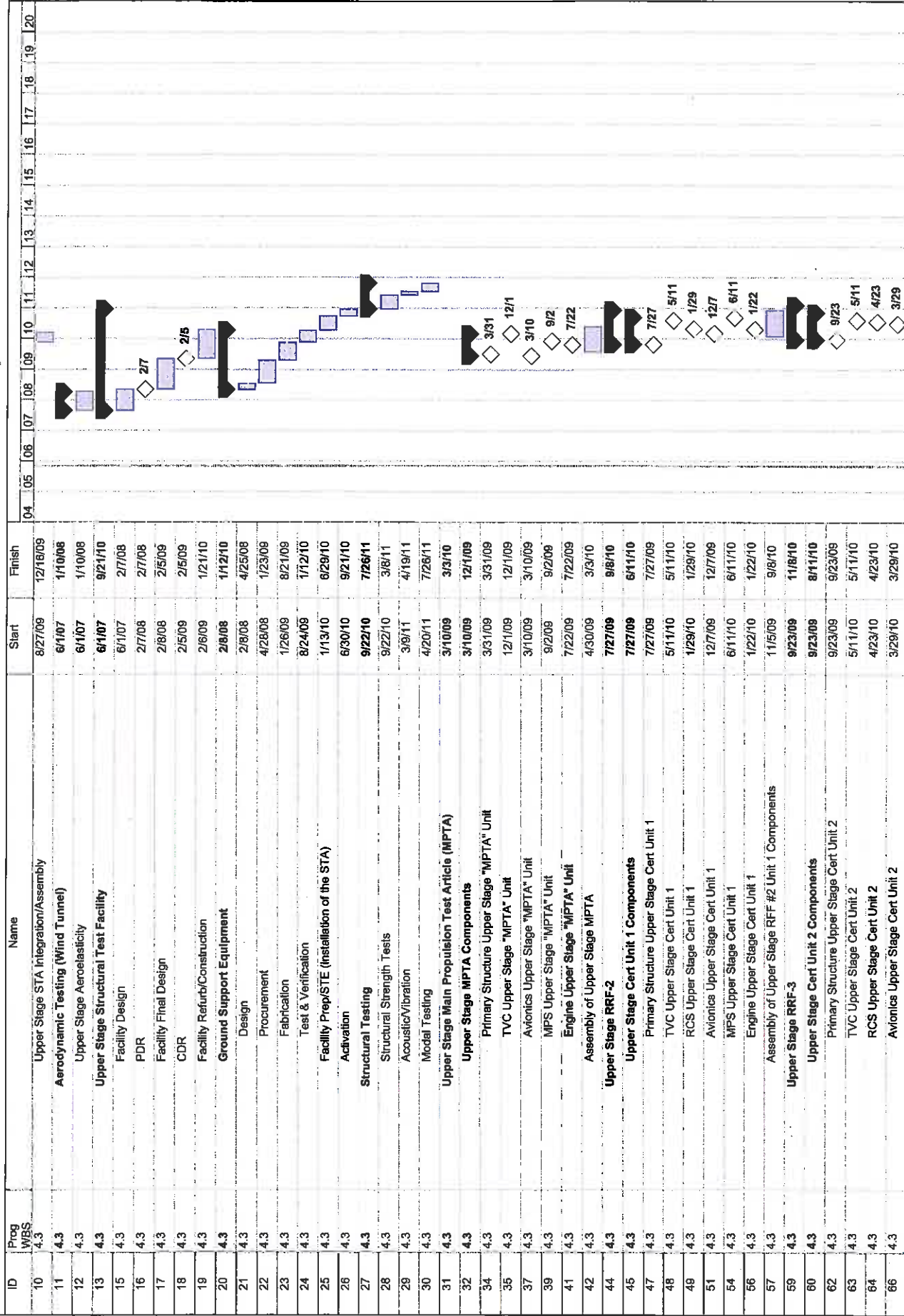
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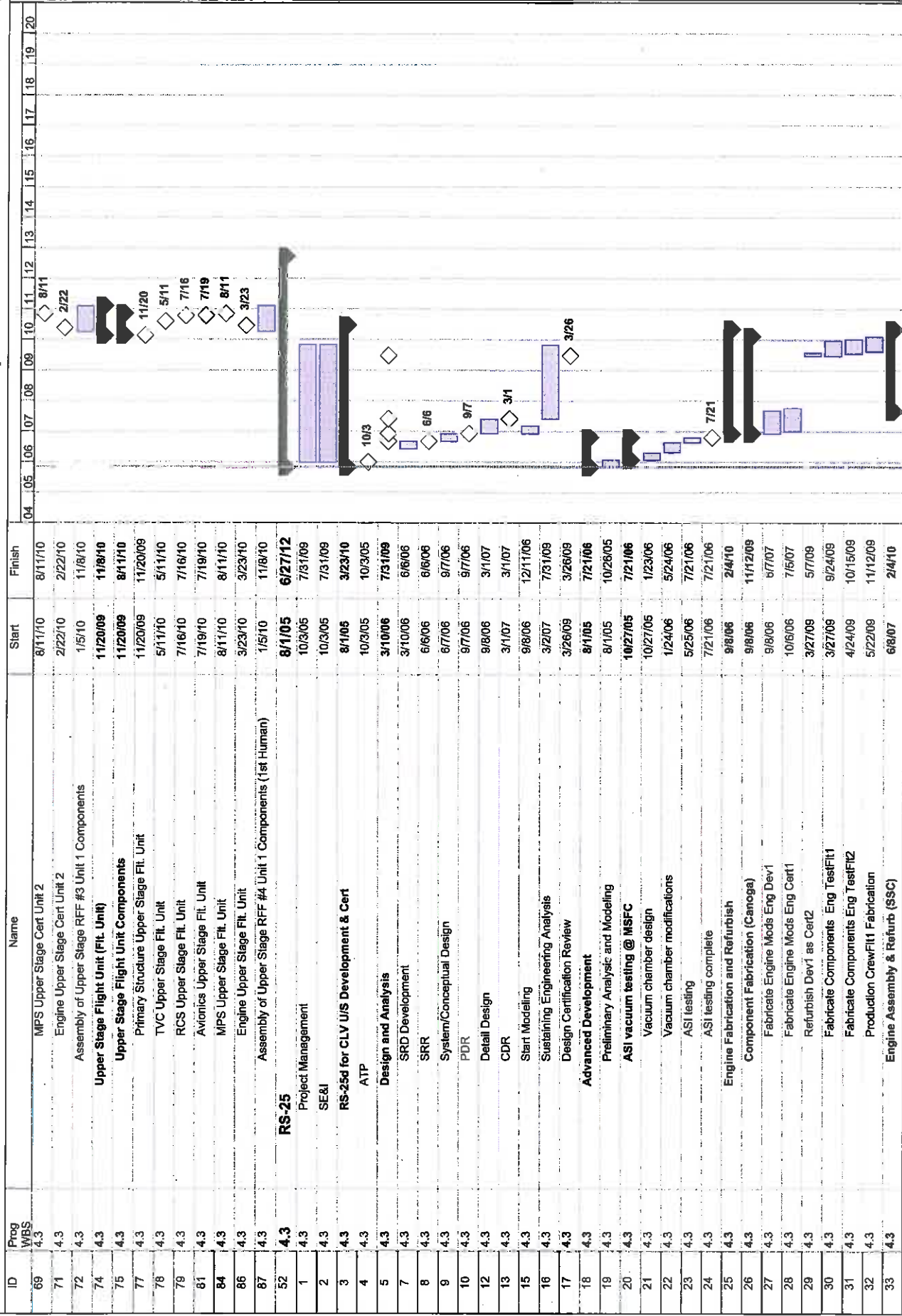
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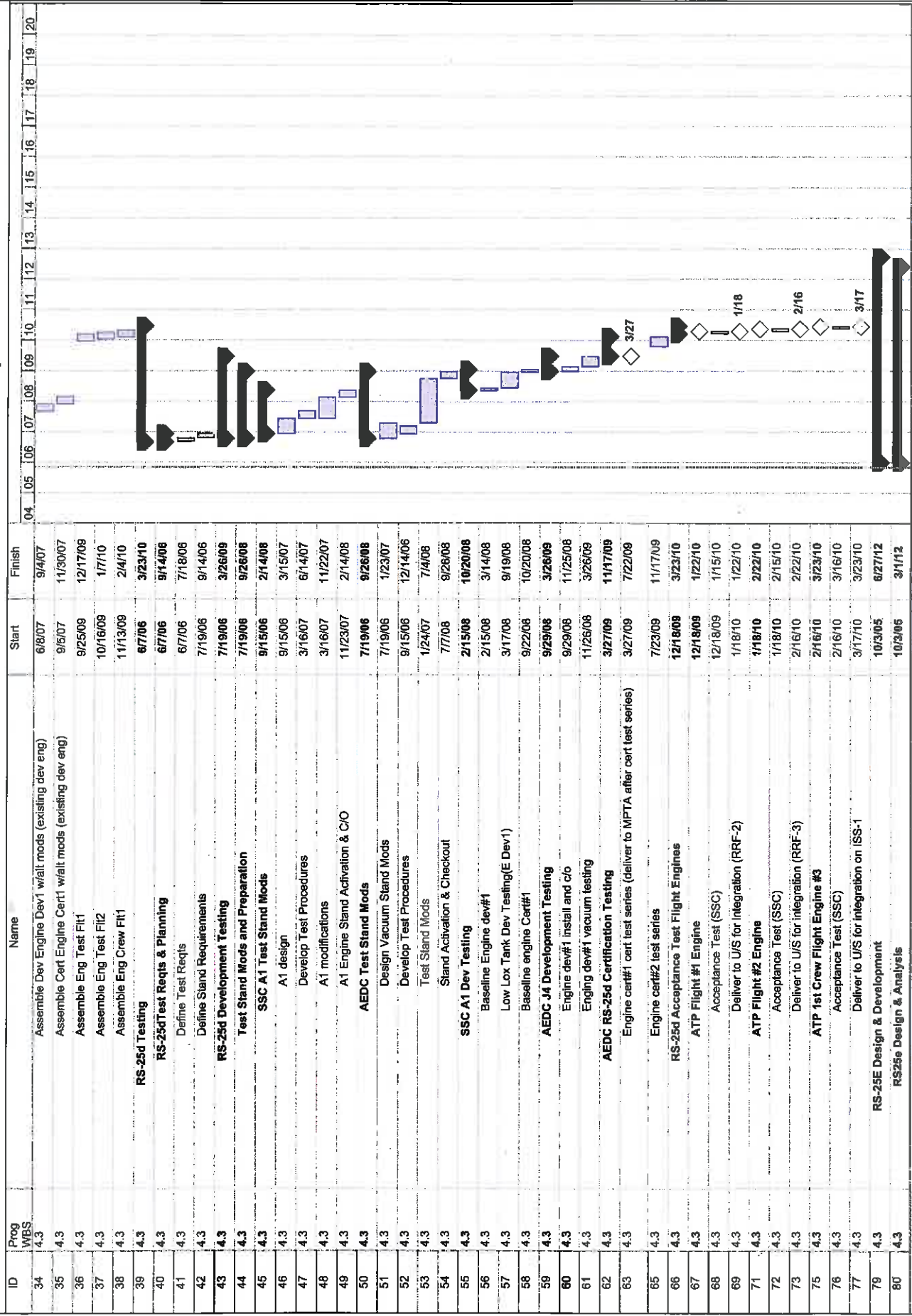
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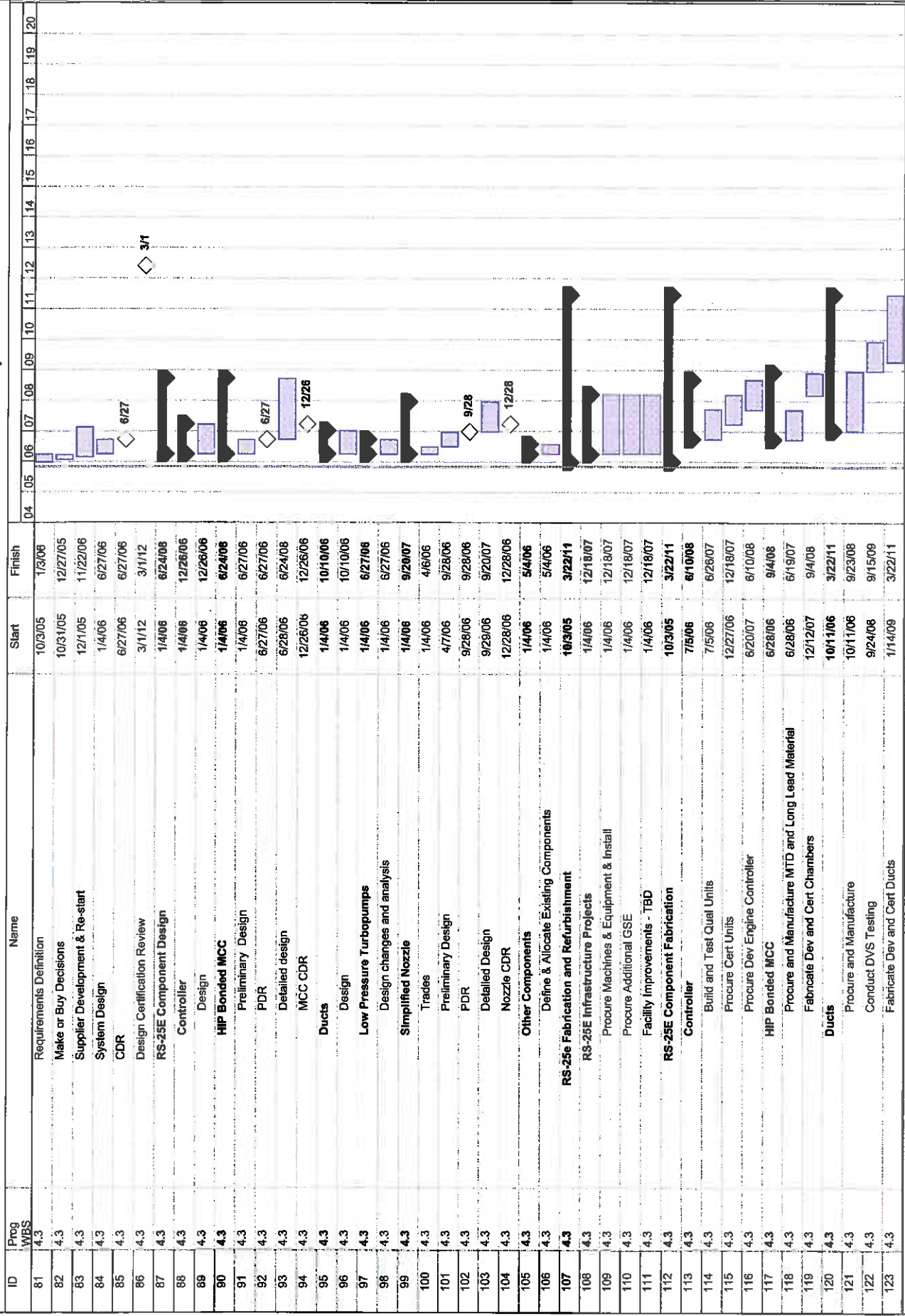
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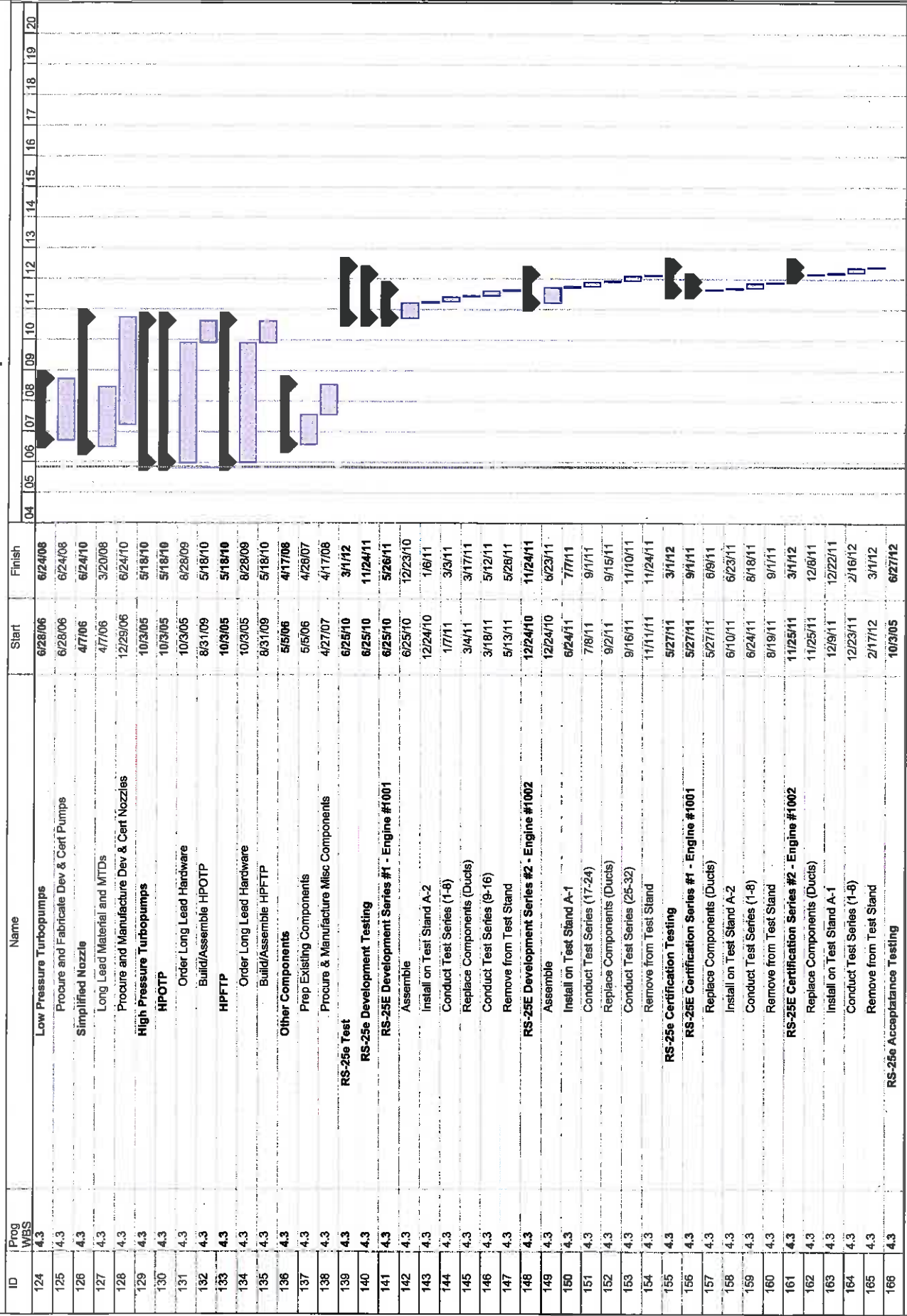
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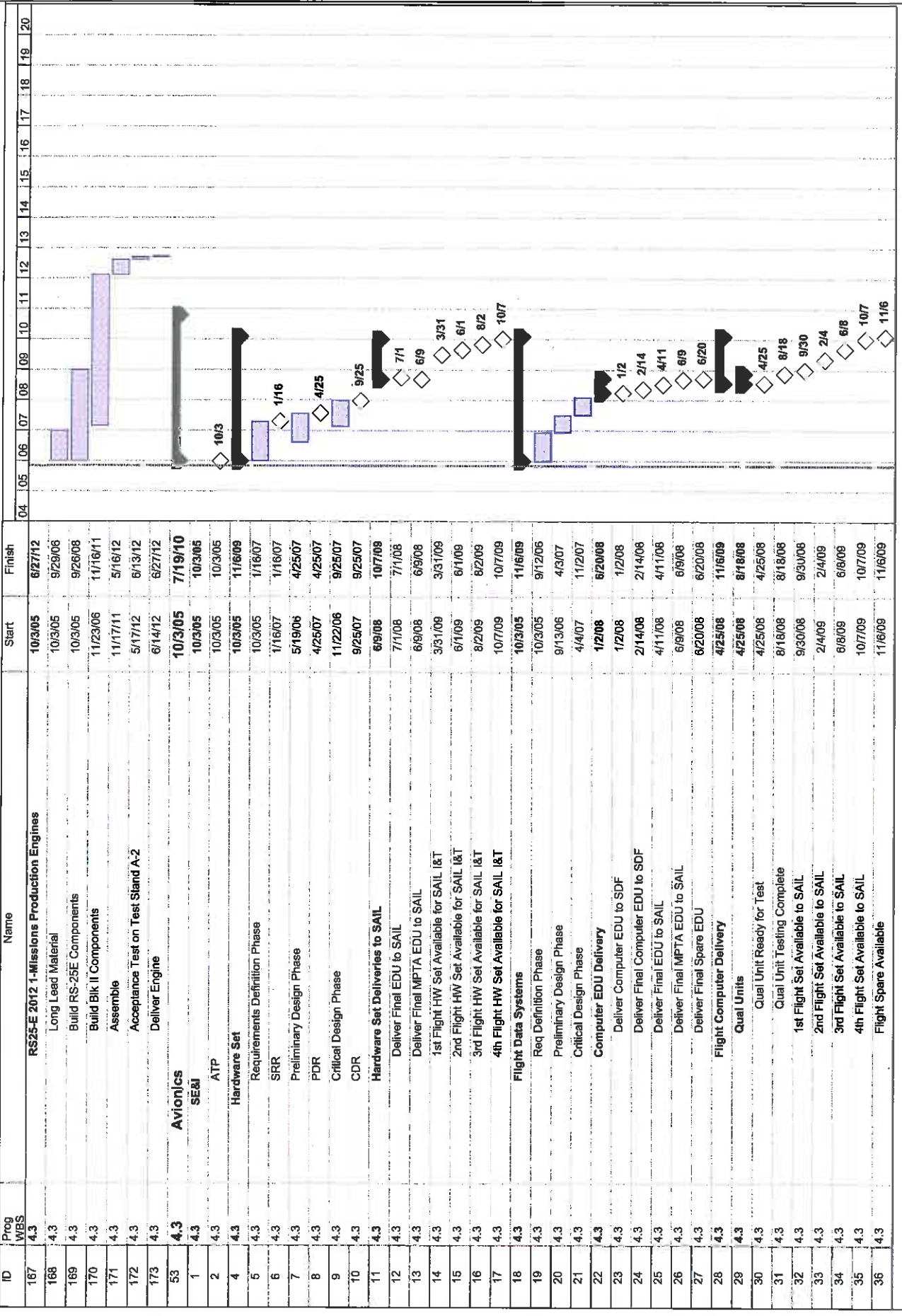
ESAS Integrated Master Schedule - 1.5 Launch Option



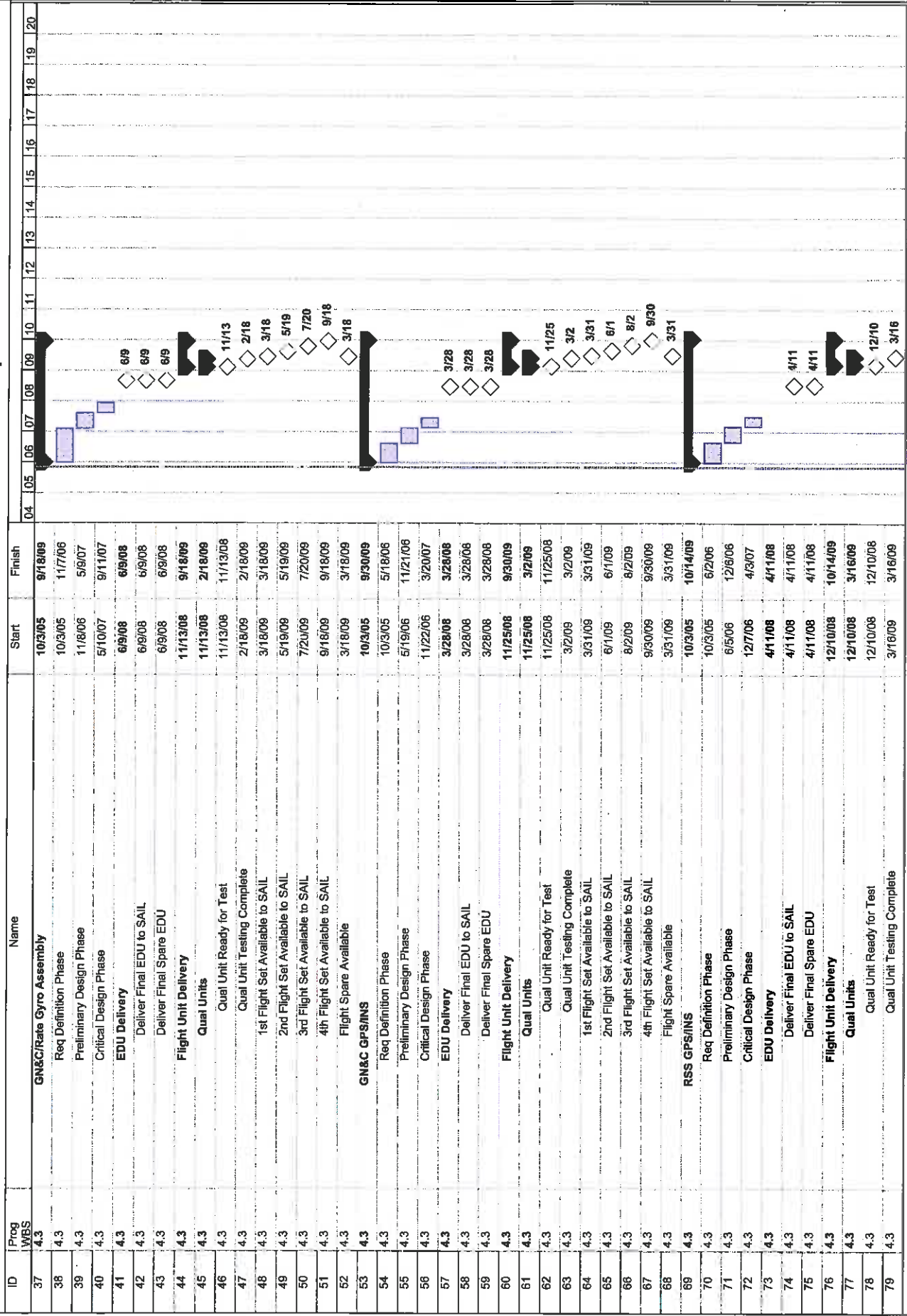
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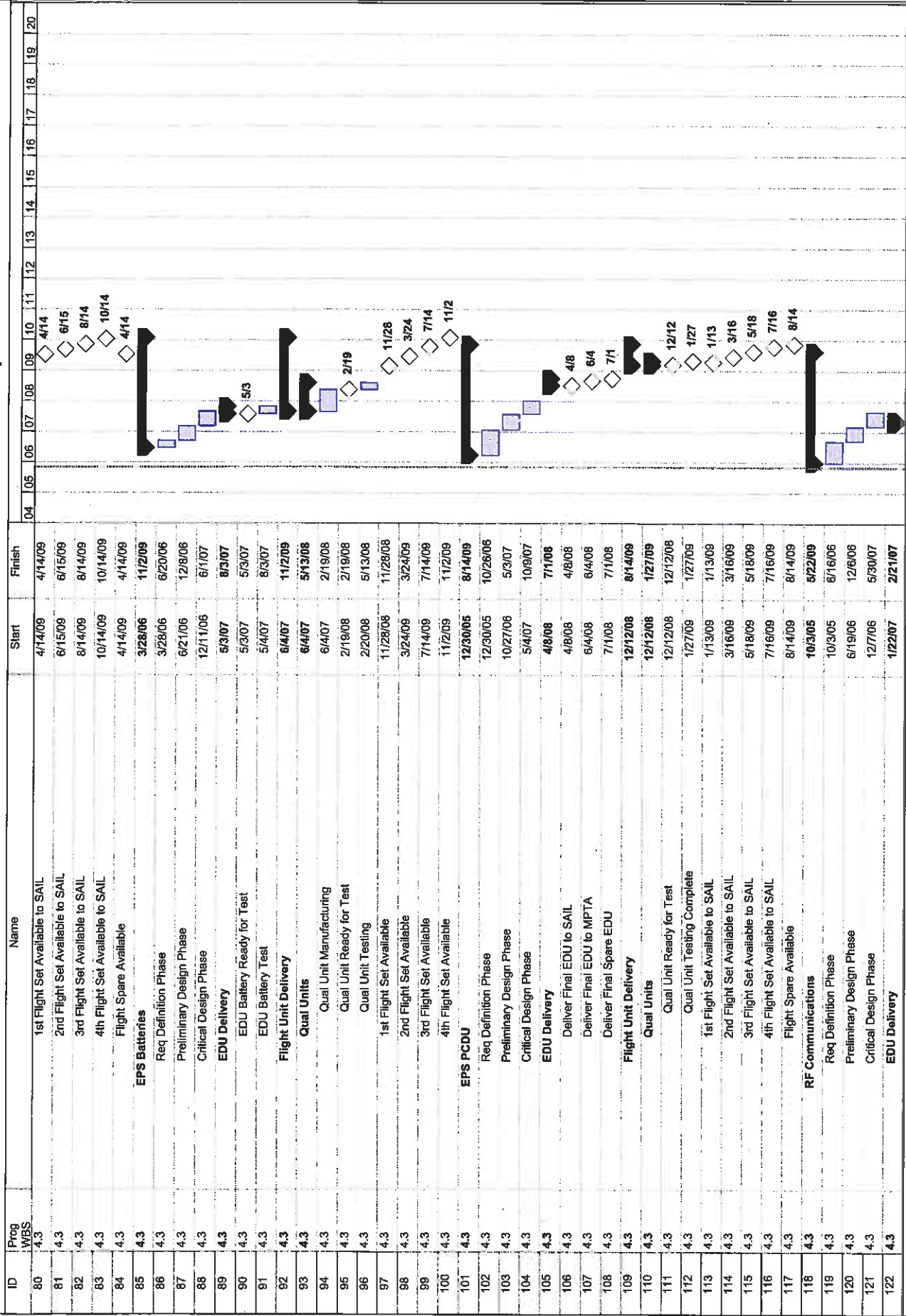
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ESAS Integrated Master Schedule - 1.5 Launch Option



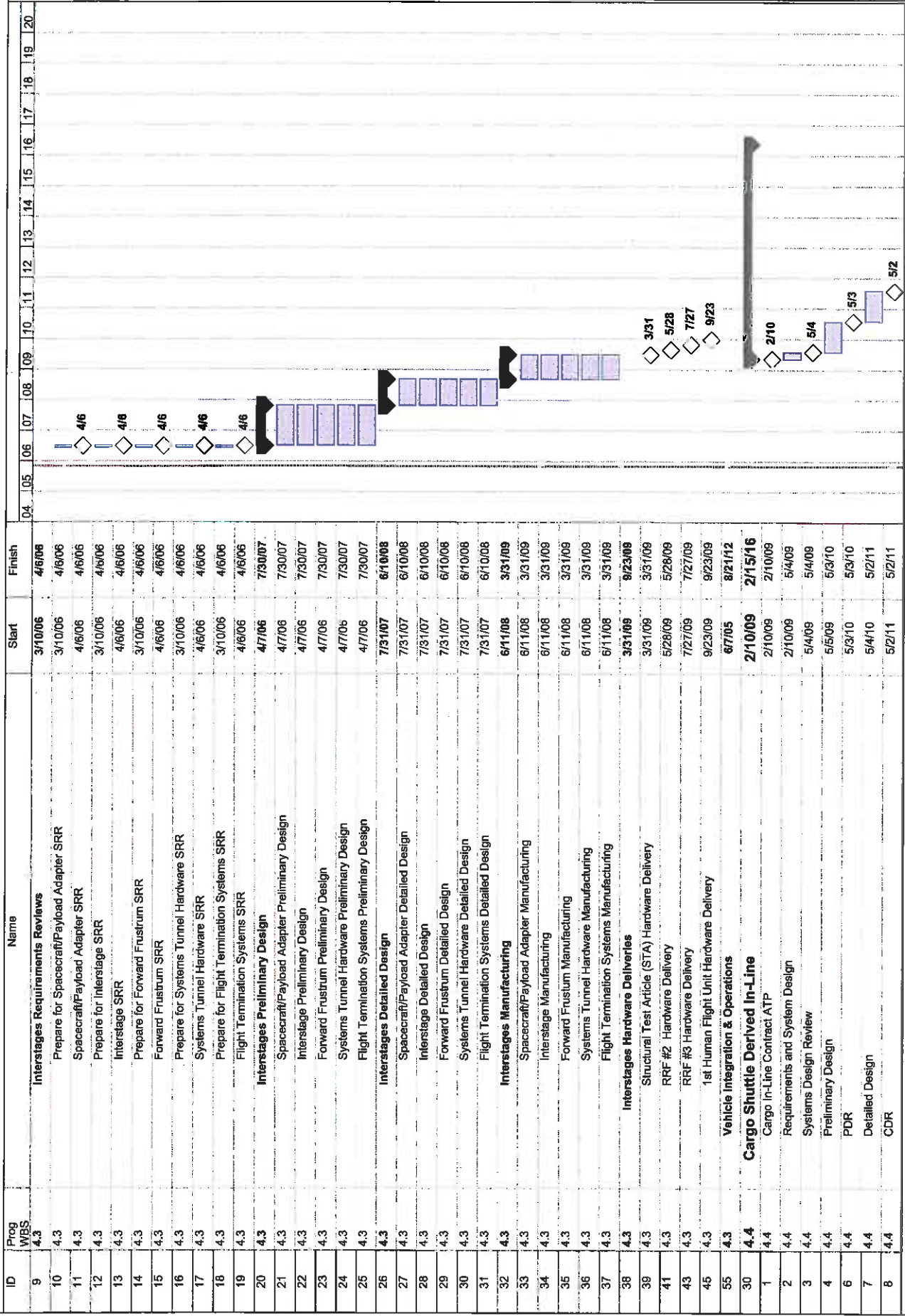
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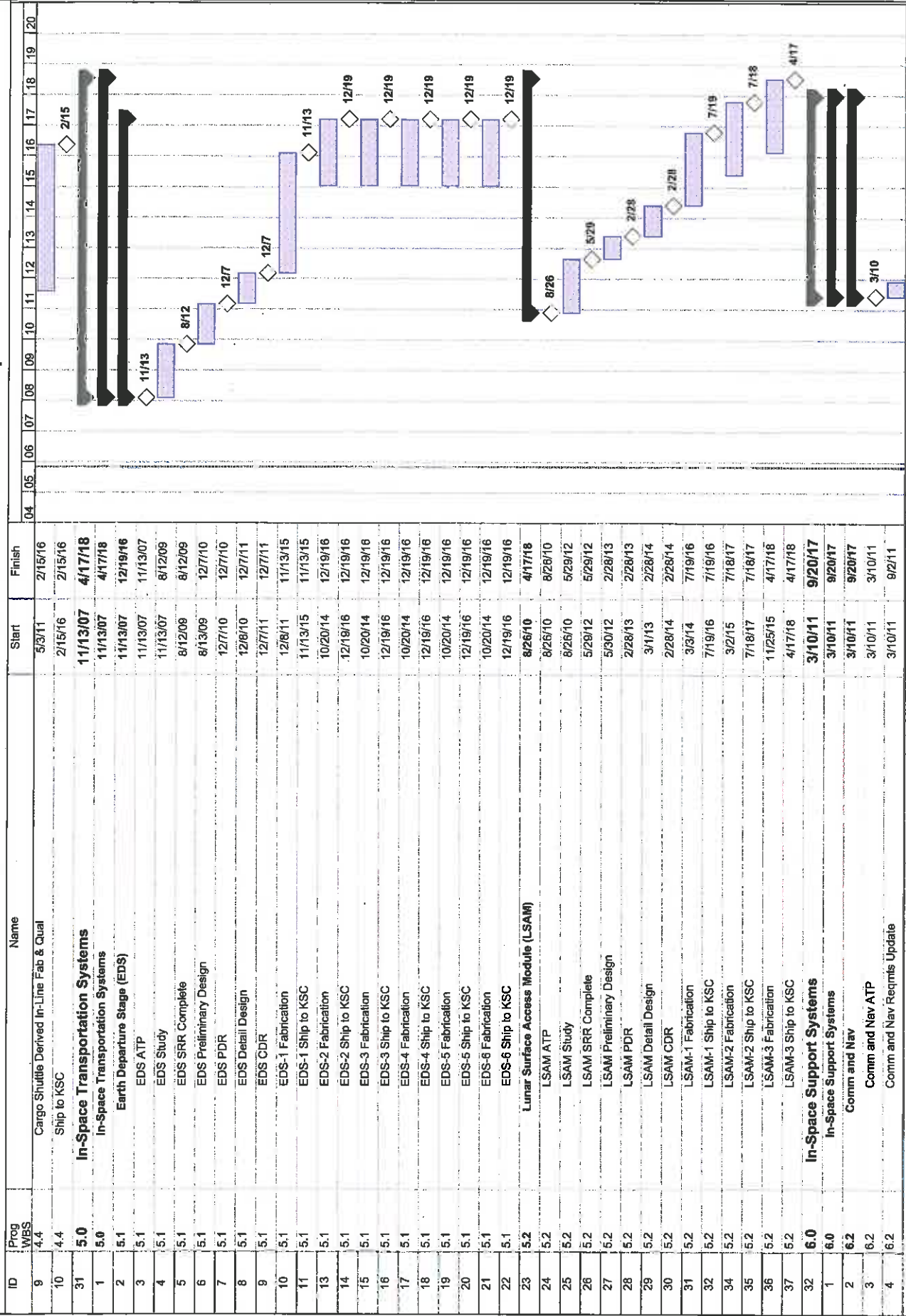
ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish
123	4.3	Deliver Final EDU to SAIL	1/22/07	1/22/07
124	4.3	Deliver Final Spare EDU	2/21/07	2/21/07
125	4.3	Flight Unit Delivery	10/28/08	5/22/09
126	4.3	Qual Units	10/28/08	12/24/08
127	4.3	Qual Unit Ready for Test	10/28/08	10/28/08
128	4.3	Qual Unit Testing Complete	12/24/08	12/24/08
129	4.3	1st Flight Set Available to SAIL	1/23/09	1/23/09
130	4.3	2nd Flight Set Available to SAIL	3/6/09	3/6/09
131	4.3	3rd Flight Set Available to SAIL	4/17/09	4/17/09
132	4.3	4th Flight Set Available to SAIL	5/22/09	5/22/09
133	4.3	Flight Spare Available	1/23/09	1/23/09
134	4.3	Flight Software	12/16/05	7/21/09
136	4.3	Software Req Definition Phase	12/16/05	1/2/07
137	4.3	Software RR	1/2/07	1/2/07
138	4.3	Software PDR	6/1/07	6/1/07
139	4.3	Software Design Phase	9/18/08	12/17/07
140	4.3	Software CDR	1/2/08	1/2/08
141	4.3	Receive Computer EDU	1/2/08	1/2/08
142	4.3	Software Implementation & Test	9/17/07	10/16/08
143	4.3	Software Delivery #1	9/18/08	9/18/08
144	4.3	Software Delivery #2	3/19/09	3/19/09
145	4.3	Formal Software V&V	7/18/08	7/21/09
146	4.3	Final Software Delivery	7/21/09	7/21/09
147	4.3	Avionics System Integration & Test	12/18/06	7/19/10
148	4.3	SAIL Development	12/18/06	11/28/07
149	4.3	SAIL Integration & C/O	12/8/07	12/12/08
150	4.3	SAIL Operational	12/12/08	12/12/08
151	4.3	MPTA Avionics Functional Test	12/15/08	3/10/09
152	4.3	Avionics Set Available for MPTA	3/10/09	3/10/09
154	4.3	1st Flight Avionics Set Integ & Test	4/1/09	8/17/09
155	4.3	Avionics Set Available for Demo Flight	8/17/09	8/17/09
156	4.3	2nd Flight Avionics Set Integ & Test	8/18/09	12/7/09
157	4.3	Avionics Set Available for RRF #2	12/7/09	12/7/09
159	4.3	3rd Flight Avionics Set Integ & Test	12/8/09	3/29/10
160	4.3	Avionics Set Available for RRF #3	3/29/10	3/29/10
162	4.3	4th Flight Avionics Set Integ & Test	3/30/10	7/19/10
163	4.3	Avionics Set Available for Human Flight	7/19/10	7/19/10
54	4.3	Interstages	3/9/06	9/23/09
1	4.3	Interstages Milestones	3/9/06	6/10/08
3	4.3	Interstage SRR	3/9/06	3/9/06
4	4.3	Interstages PDR	7/30/07	7/30/07
6	4.3	Interstages CDR	6/10/08	6/10/08
8	4.3	Interstages	3/10/06	3/31/08

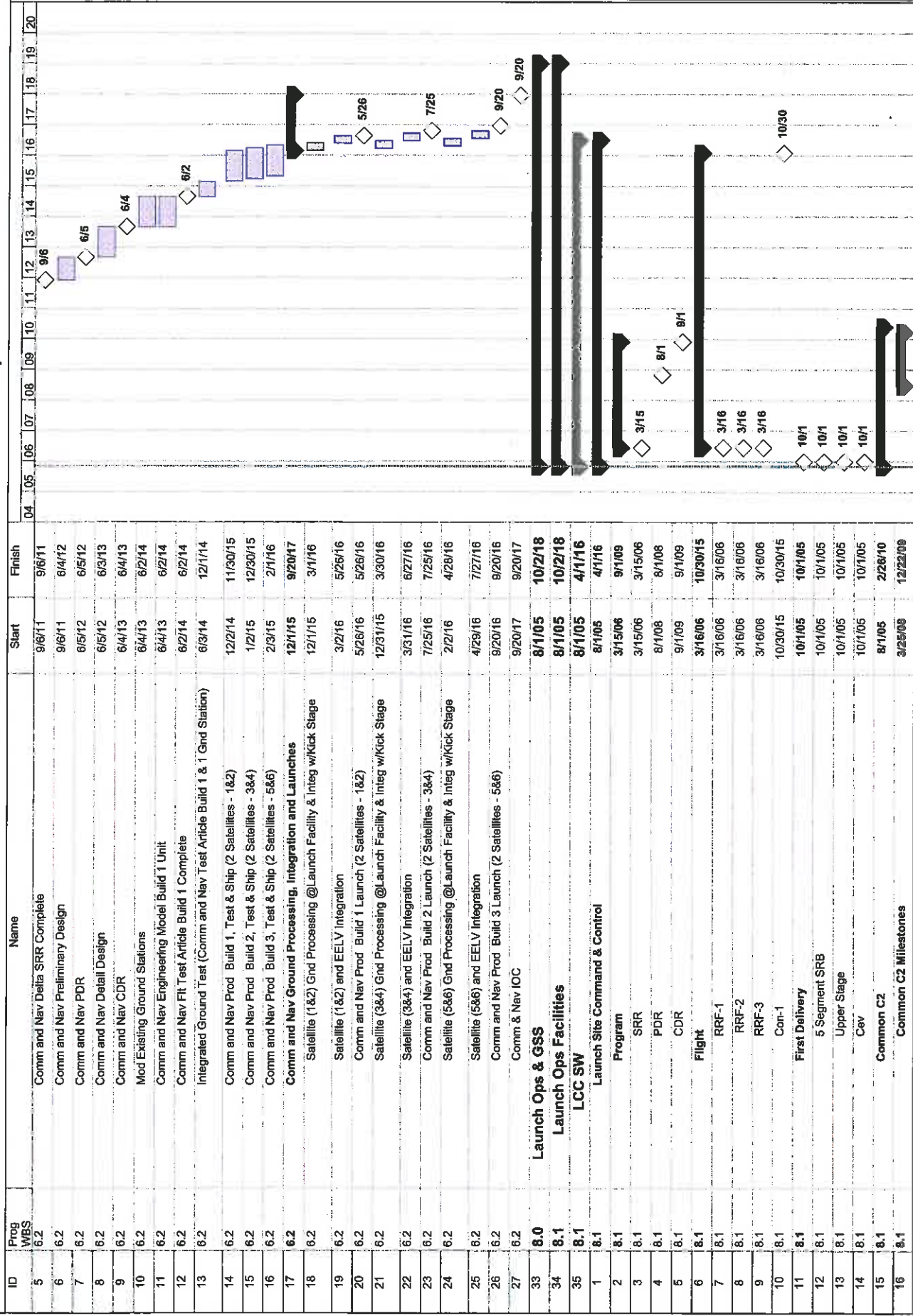
ESAS Integrated Master Schedule - 1.5 Launch Option



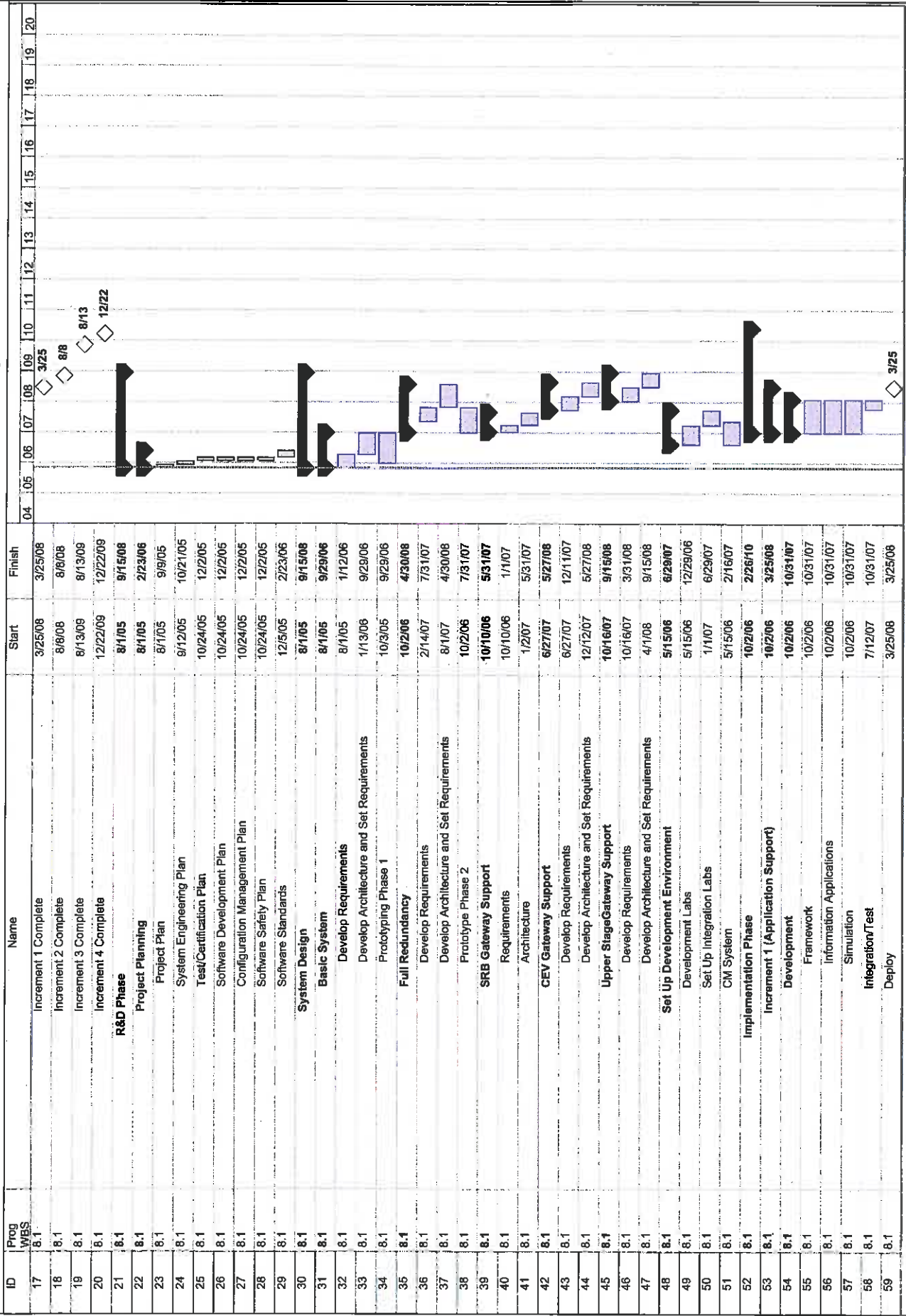
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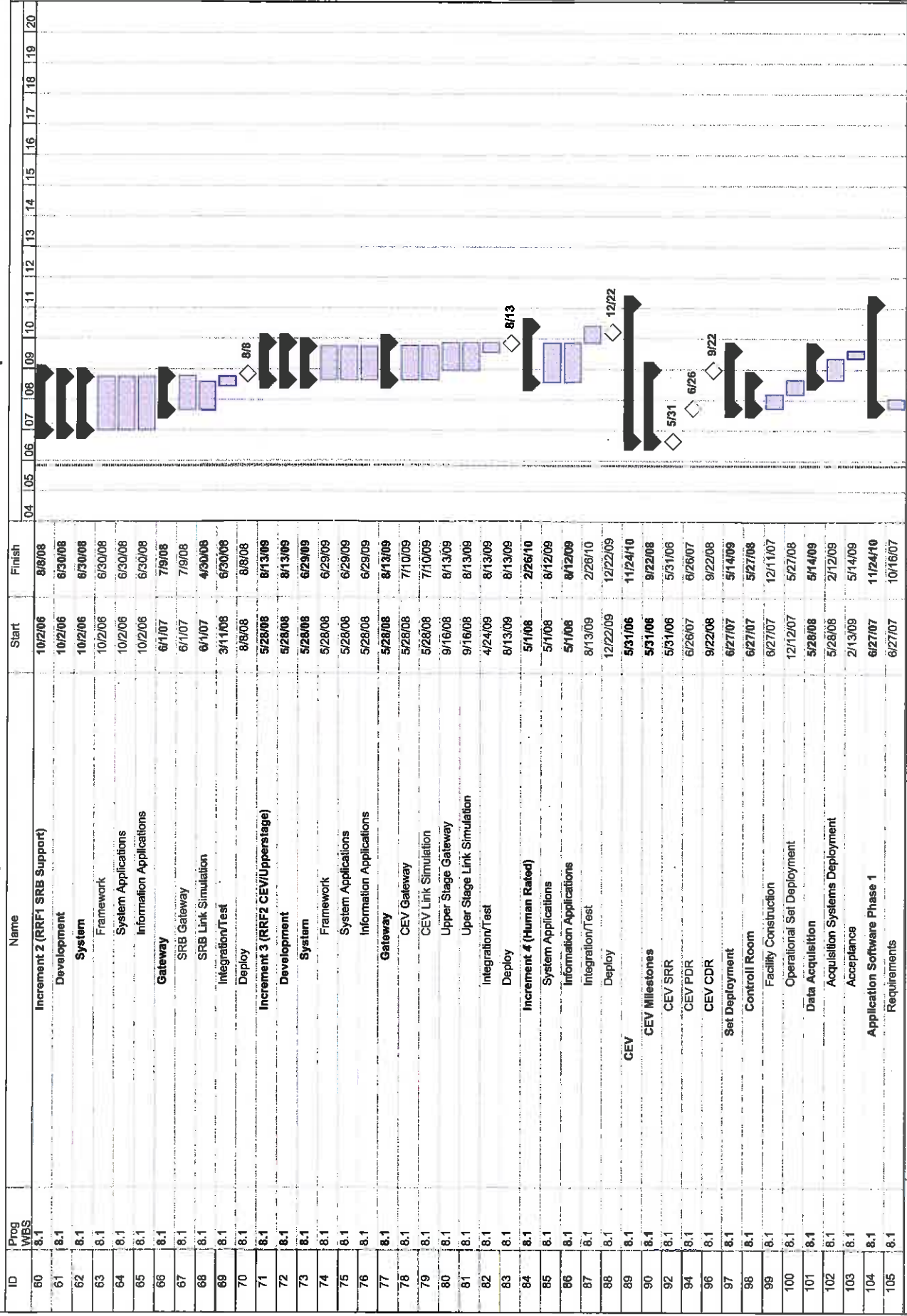
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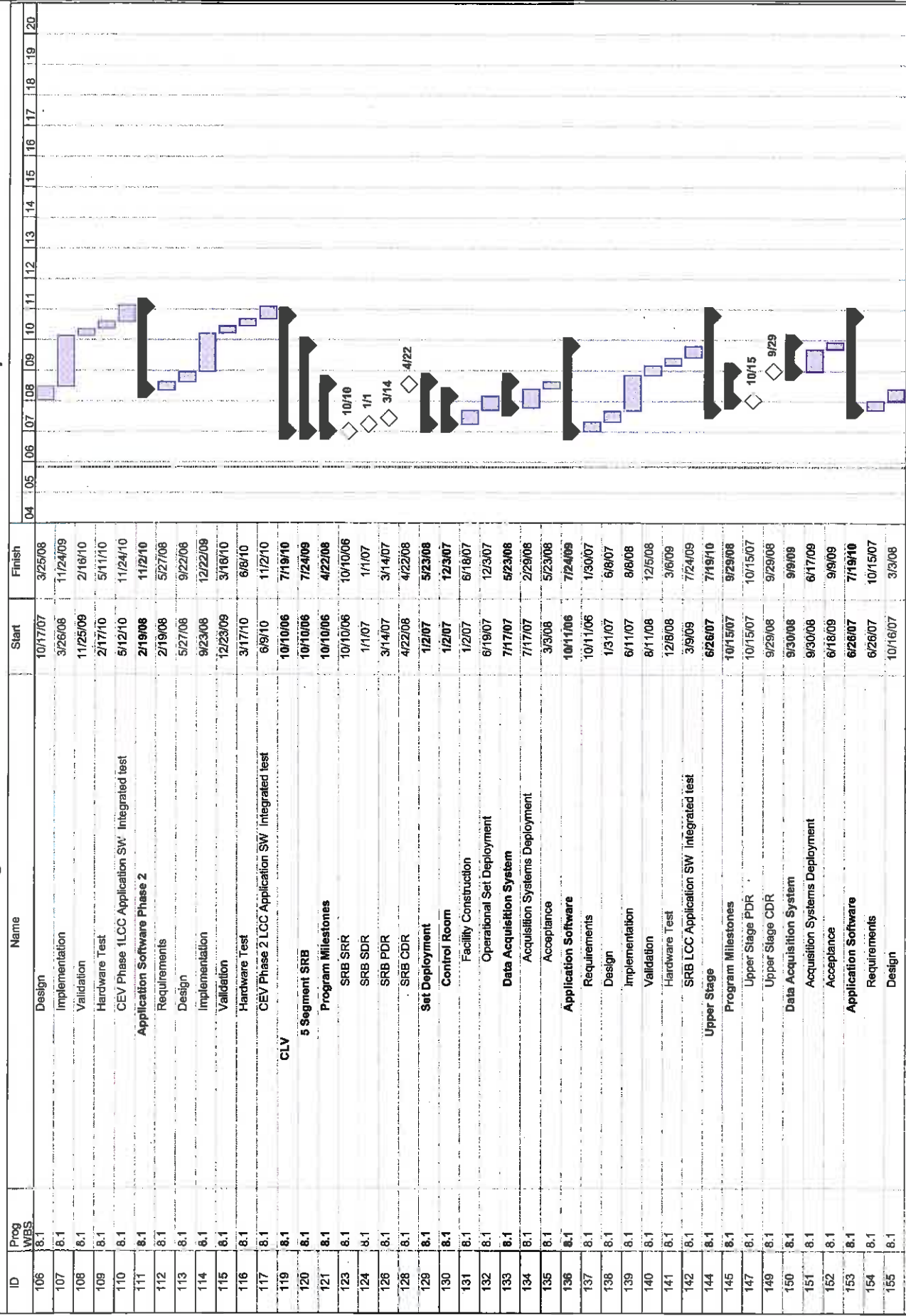
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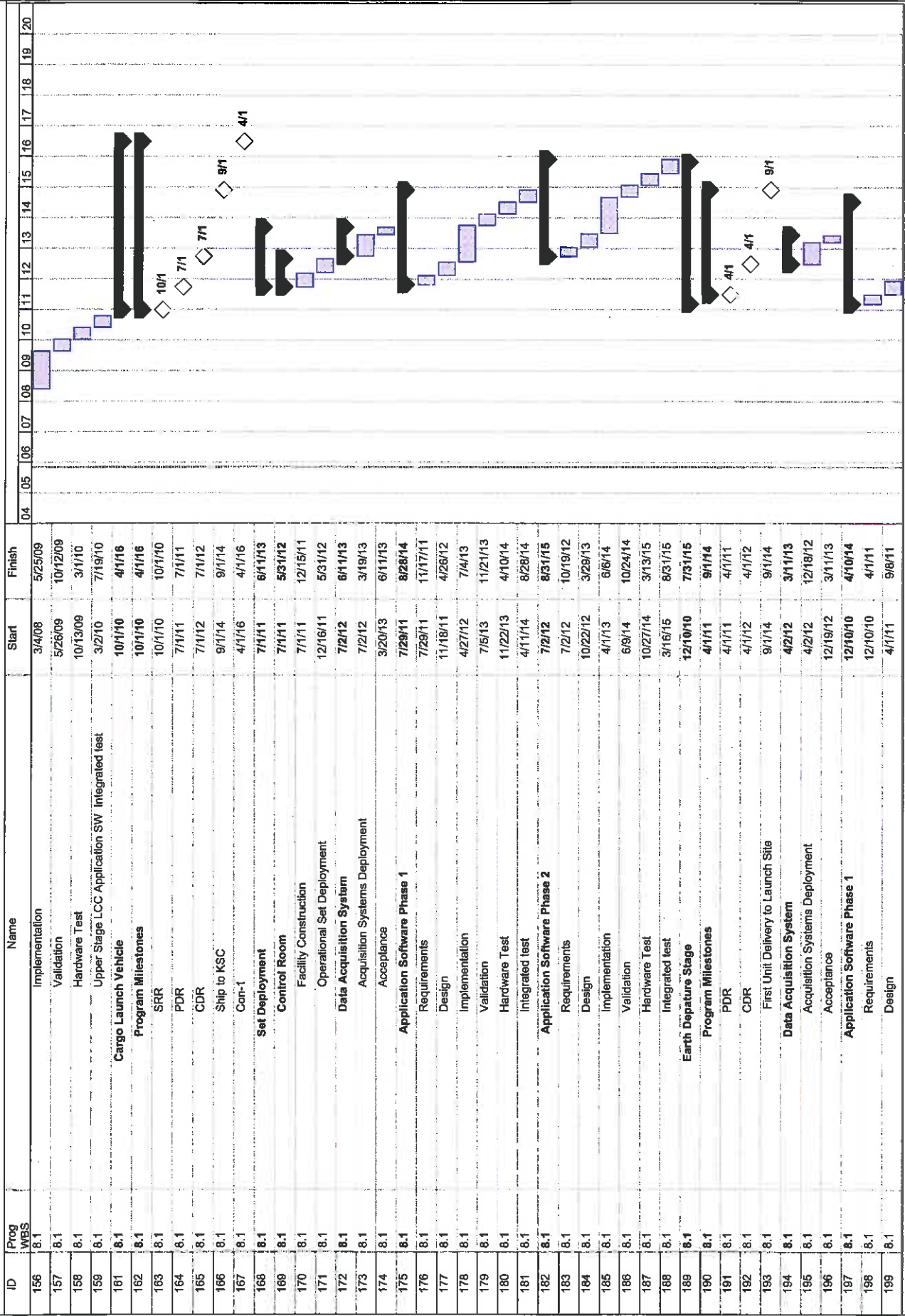
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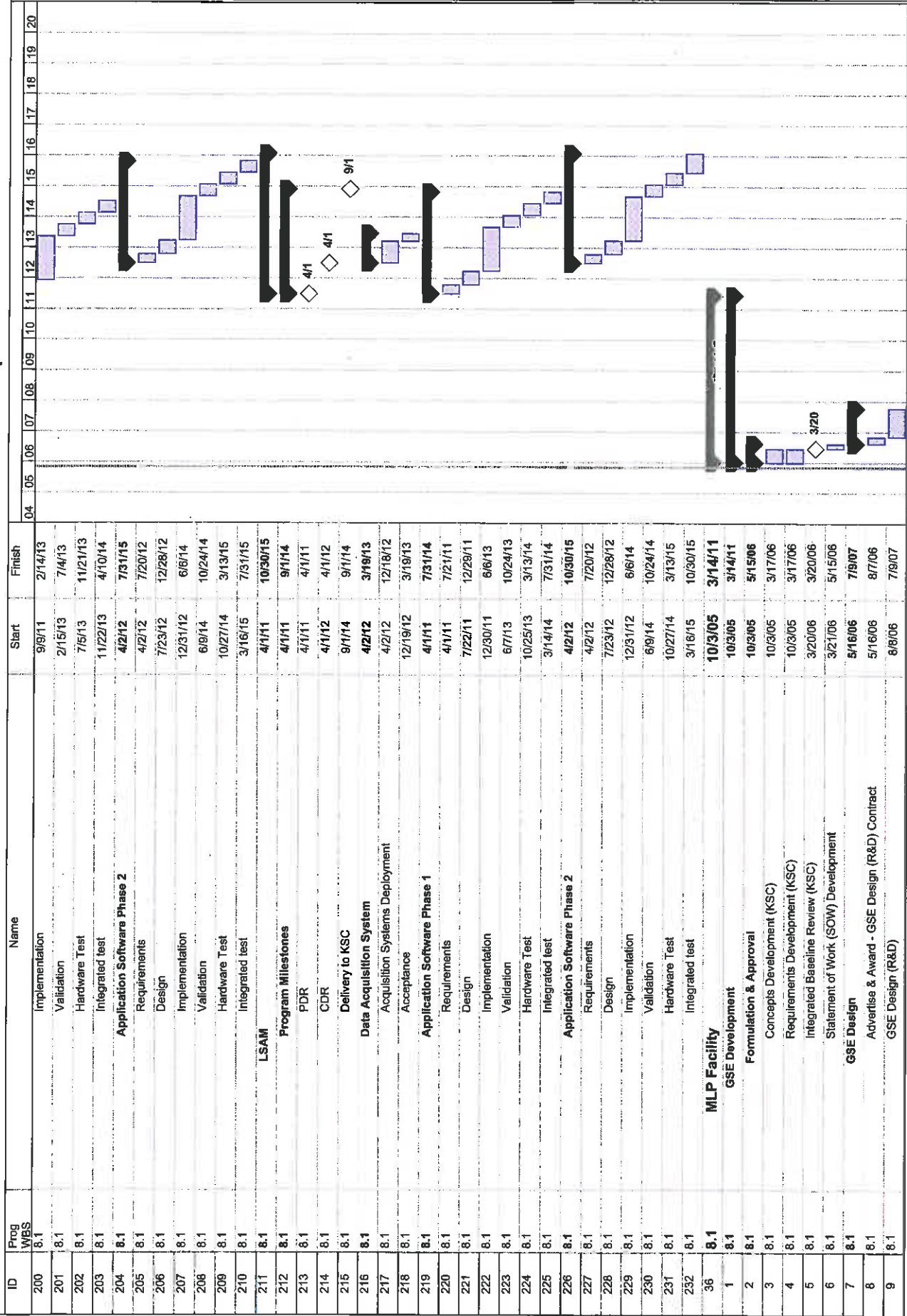
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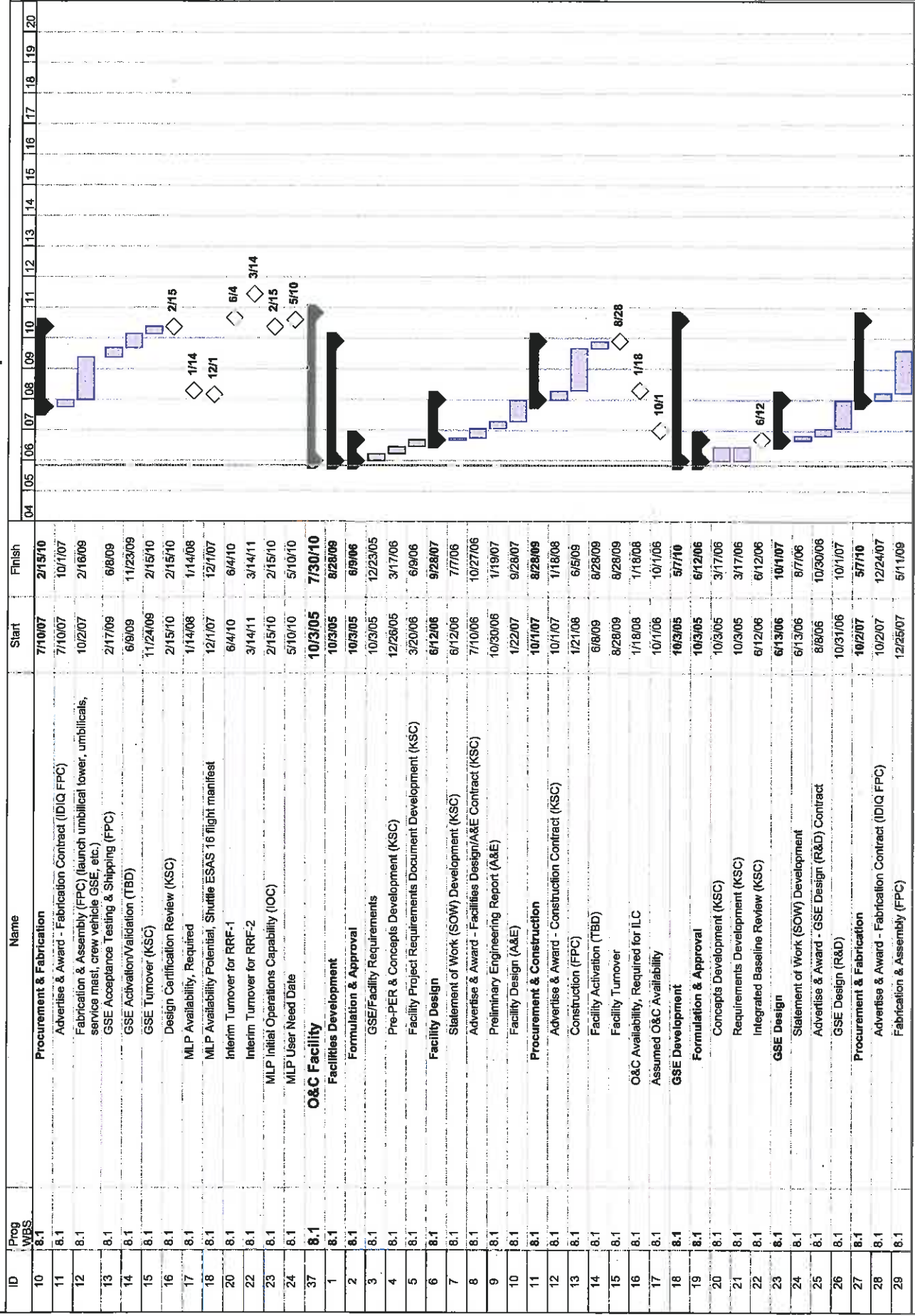
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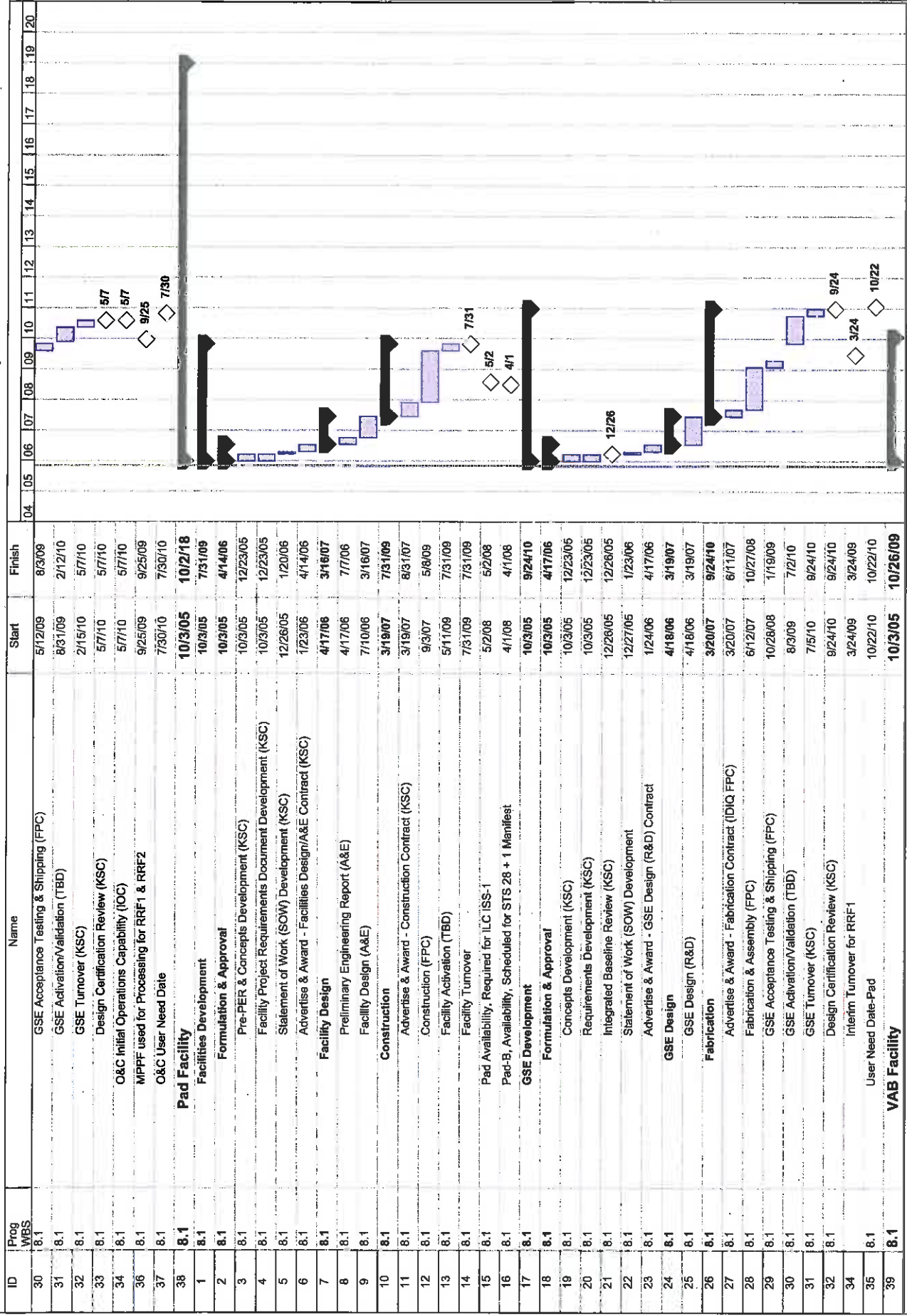
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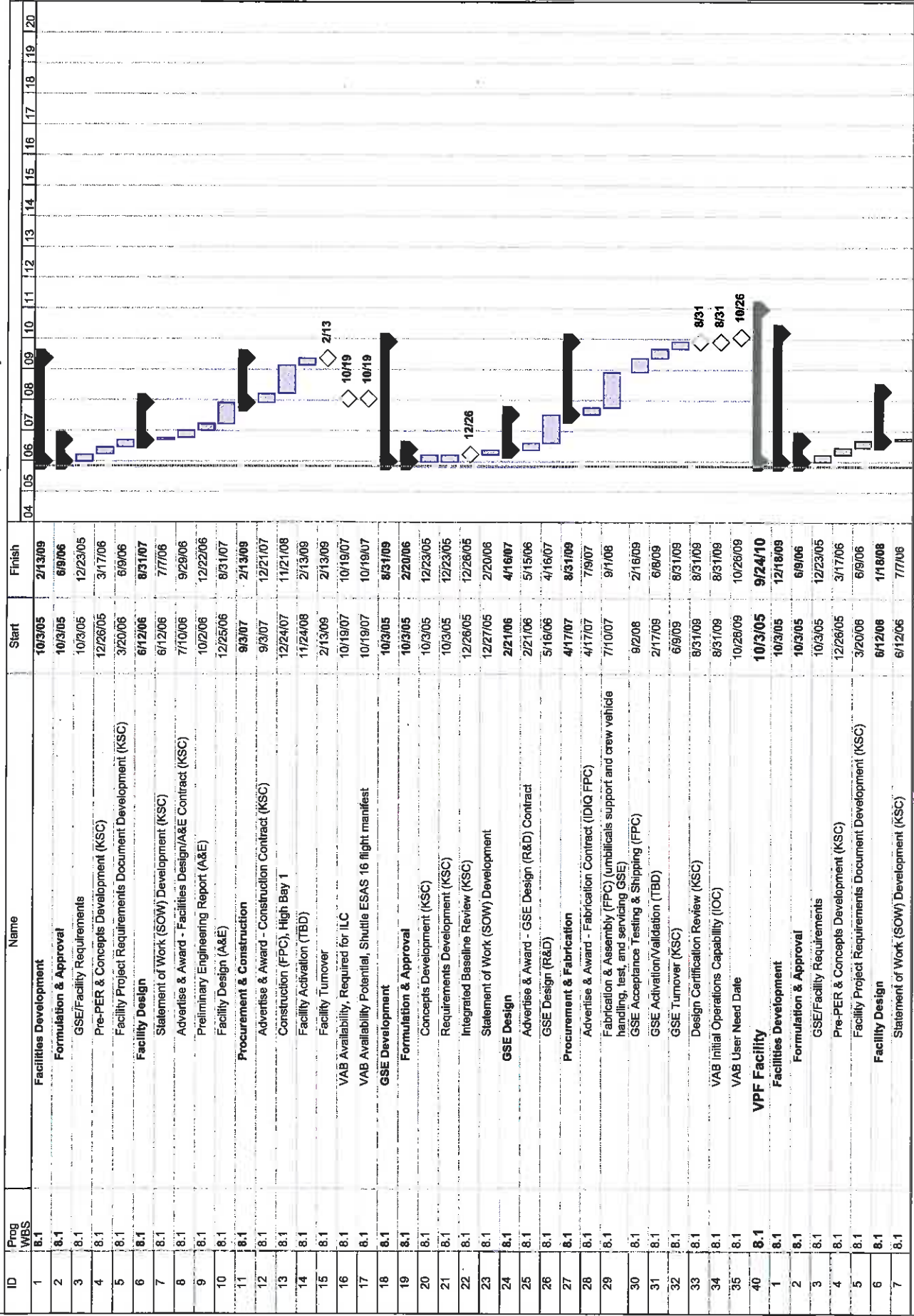
ESAS Integrated Master Schedule - 1.5 Launch Option



ESAS Integrated Master Schedule - 1.5 Launch Option

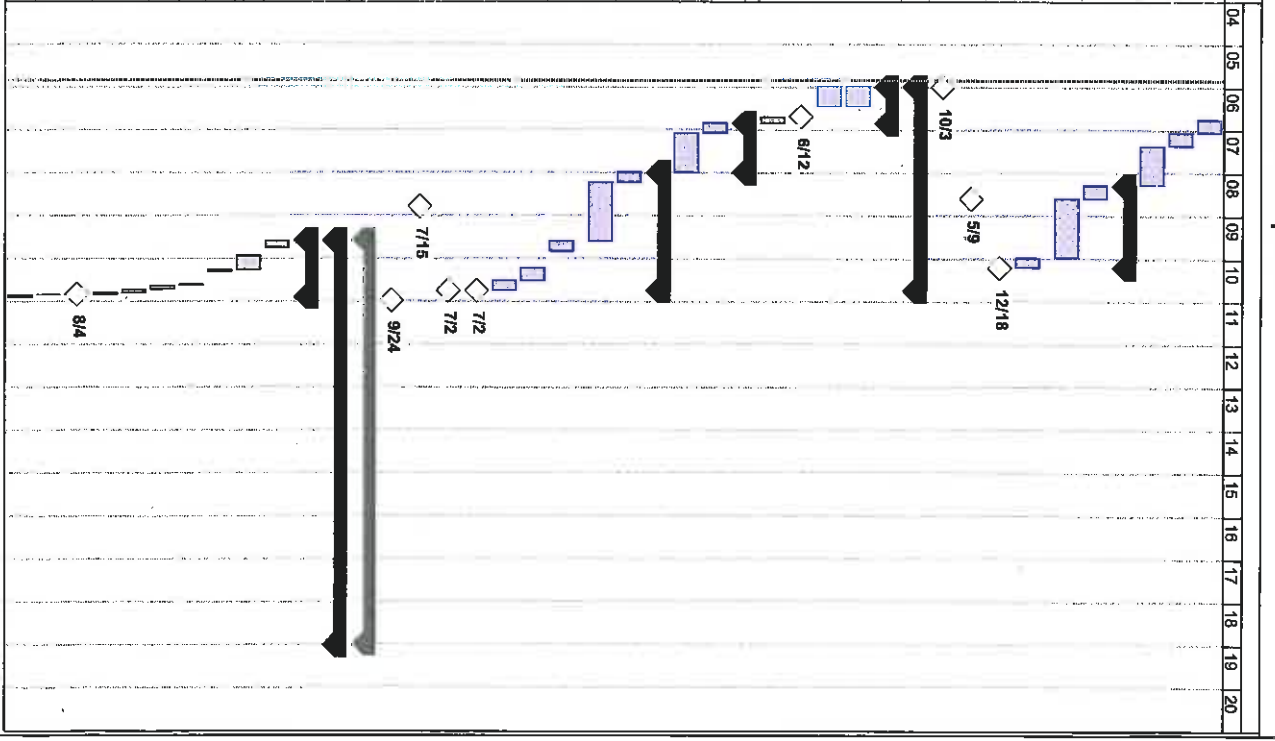


ESAS Integrated Master Schedule - 1.5 Launch Option

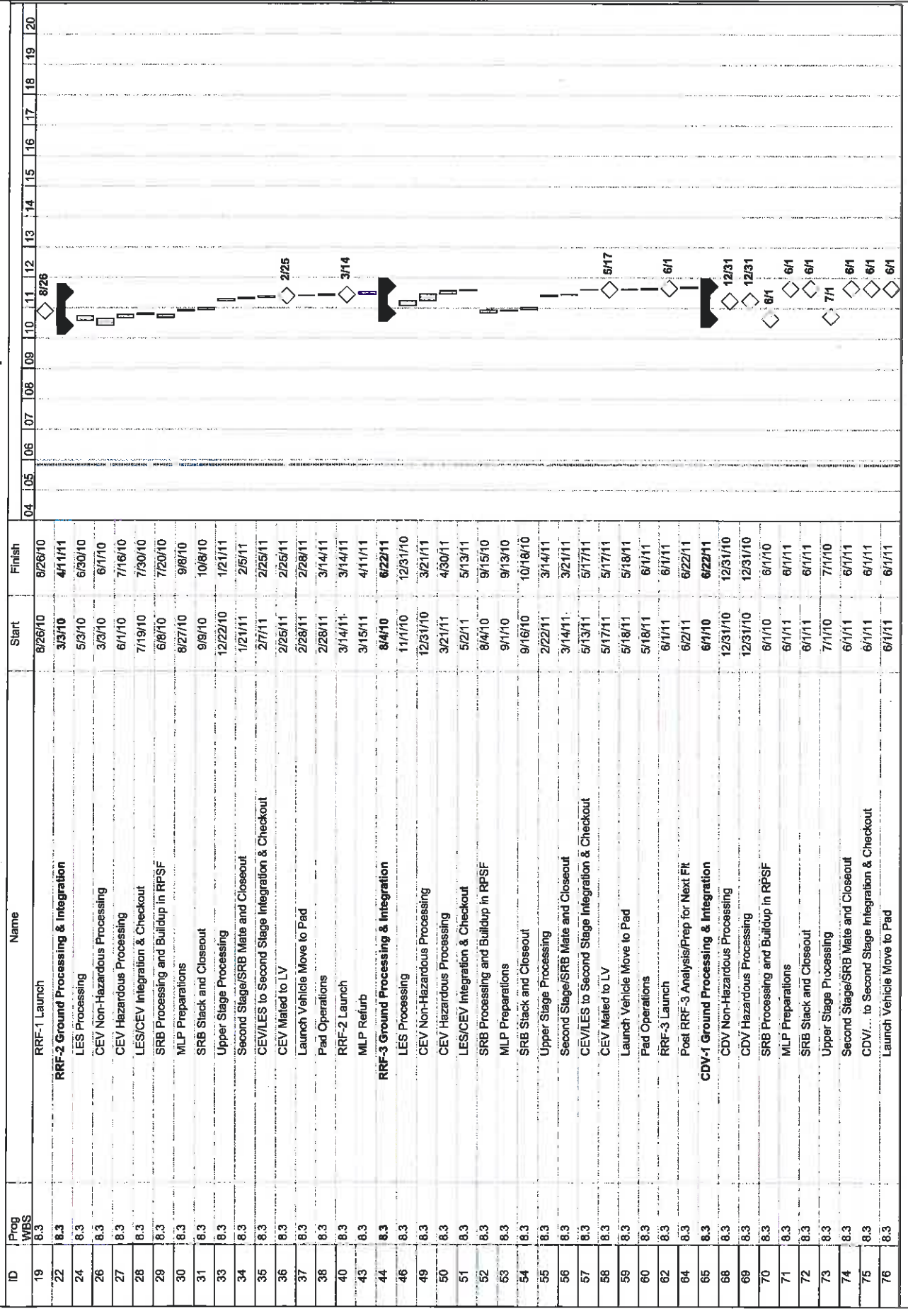


ESAS Integrated Master Schedule - 1.5 Launch Option

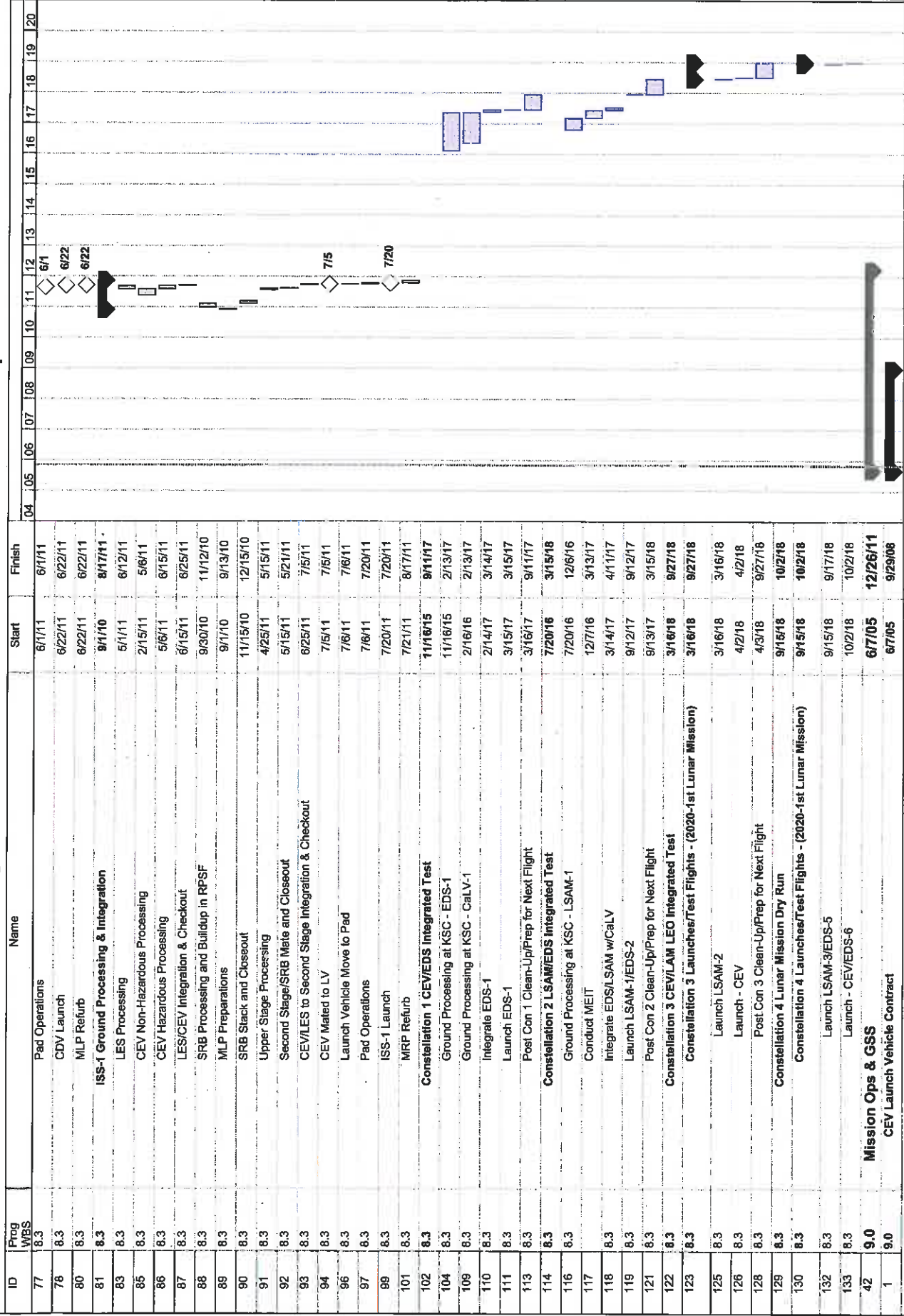
ID	Prog WBS	Name	Start	Finish
8	8.1	Advise & Award - Facilities Design/A&E Contract (KSC)	7/1/06	10/27/08
9	8.1	Preliminary Engineering Report (A&E) Facility Design (A&E)	10/30/06	2/16/07
10	8.1	Procurement & Construction	2/19/07	1/18/08
11	8.1	Advise & Award - Construction Contract (KSC)	1/21/08	5/6/08
12	8.1	Construction (FPC) (Mod VPF by removing test cells & GSE, refurbish floor, provide propellant servicing and scrubbers, etc.) Facility Activation (TBD)	5/12/08	9/25/09
13	8.1	Facility Turnover	9/28/09	12/18/09
14	8.1	VPF Availability, Required for LLC	12/18/09	12/18/09
15	8.1	Assumed VPF Availability	5/9/08	5/9/08
16	8.1	GSE Development	10/3/05	10/3/05
17	8.1	Formulation & Approval	10/3/05	7/2/10
18	8.1	Concepts Development (KSC)	10/3/05	8/7/06
19	8.1	Requirements Development (KSC)	10/3/05	3/17/06
20	8.1	Integrated Baseline Review (KSC)	6/12/06	6/12/06
21	8.1	Statement of Work (SOW) Development	6/13/06	8/7/06
22	8.1	GSE Design	8/8/06	10/1/07
23	8.1	Advise & Award - GSE Design (R&D) Contract	8/8/06	10/30/06
24	8.1	GSE Design (R&D)	10/31/06	10/1/07
25	8.1	Procurement & Fabrication	10/2/07	7/2/10
26	8.1	Advise & Award - Fabrication Contract (IDIG FPC)	10/2/07	12/24/07
27	8.1	Fabrication & Assembly (FPC) (new transporters, workstands, handling equipment, lifting slings, servicers, air pallets, etc.) GSE Acceptance Testing & Shipping (FPC)	12/25/07	5/1/09
28	8.1	GSE Activation/Validation (TBD)	5/12/09	8/3/09
29	8.1	GSE Turnover (KSC)	12/21/09	4/6/10
30	8.1	Design Certification Review (KSC)	4/12/10	7/2/10
31	8.1	VPF Initial Operations Capability (IOC)	7/2/10	7/2/10
32	8.1	MPPF used for Processing for RRF1 & RRF2	7/15/08	7/15/08
33	8.1	VPF User Need Date	9/24/10	9/24/10
34	8.1	KSC Ground Processing & Integration		
35	8.3	Launch Ops Ground Processing & Integration	5/1/09	10/2/18
36	8.3	RRF-1 Ground Processing & Integration	5/1/09	8/26/10
37	8.3	LES Processing	5/1/09	6/30/09
38	8.3	CEV Non-Hazardous Processing	9/8/09	1/6/10
39	8.3	LES/CEV Integration & Checkout	1/7/10	1/21/10
40	8.3	MLP Preparations	5/7/10	5/20/10
41	8.3	SRB Stack and Closeout	5/21/10	6/22/10
42	8.3	Second Stage/SRB Mate and Closeout	6/23/10	7/21/10
43	8.3	CEVLES to Second Stage Integration & Checkout	7/22/10	8/4/10
44	8.3	CEV Mated to LV	8/4/10	8/4/10
45	8.3	Launch Vehicle Move to Pad	8/5/10	8/6/10
46	8.3	Pad Operations	8/9/10	8/26/10



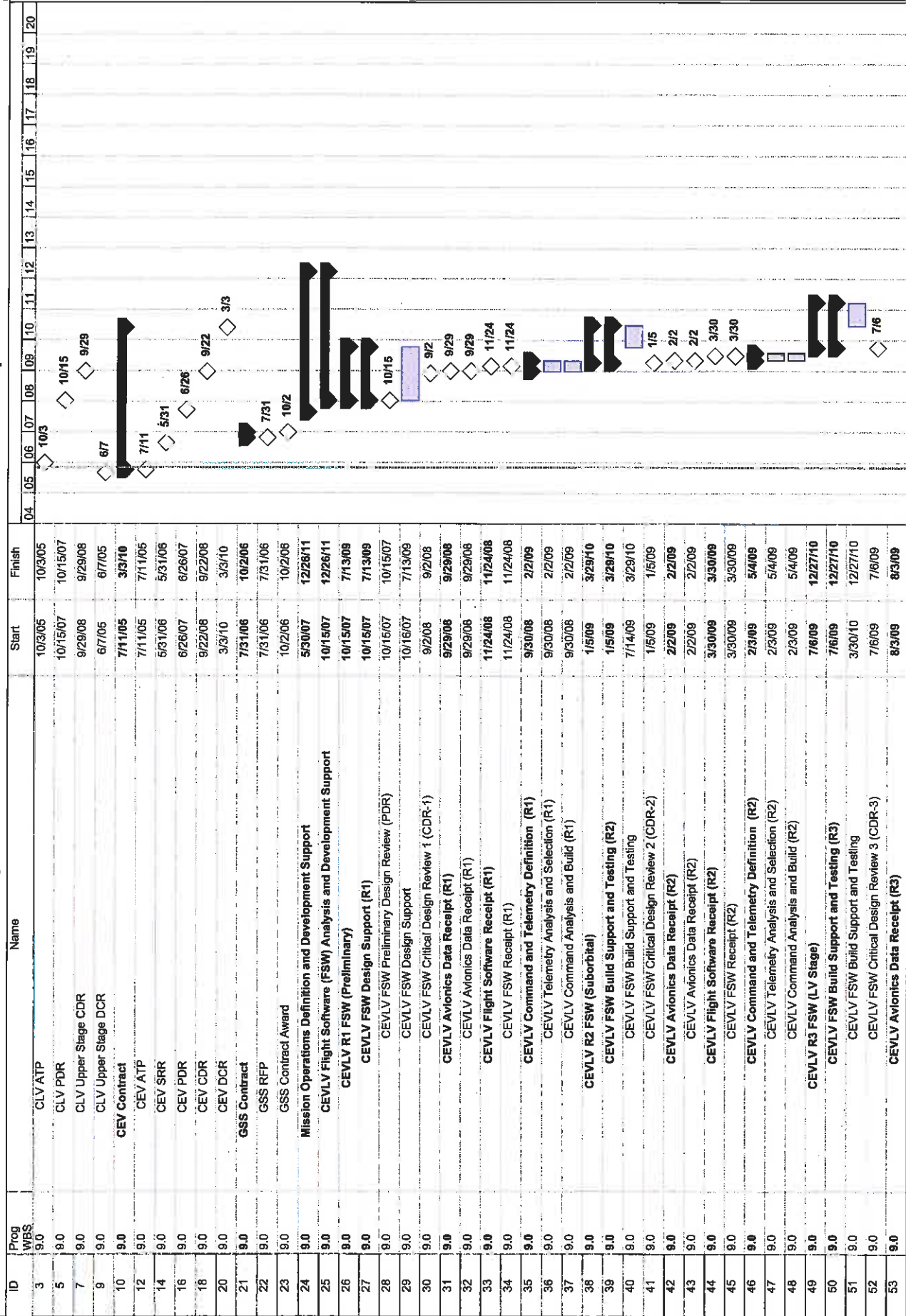
ESAS Integrated Master Schedule - 1.5 Launch Option



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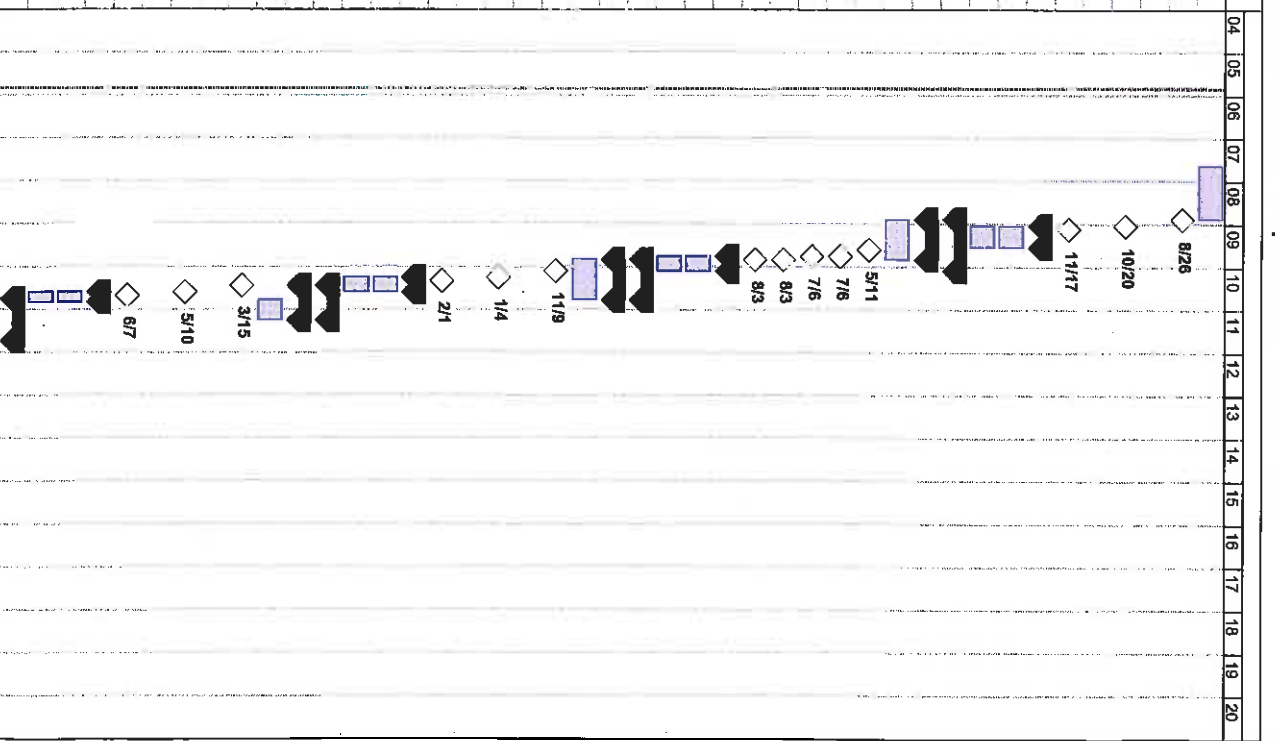


ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish
54	9.0	CEVLV Avionics Data Receipt (R3)	8/3/09	8/3/09
55	9.0	CEVLV Flight Software Receipt (R3)	9/28/09	9/28/09
56	9.0	CEVLV FSW Receipt (R3)	9/28/09	9/28/09
57	9.0	CEVLV Command and Telemetry Definition (R3)	8/4/09	11/2/09
58	9.0	CEVLV Telemetry Analysis and Selection (R3)	8/4/09	11/2/09
59	9.0	CEVLV Command Analysis and Build (R3)	8/4/09	11/2/09
60	9.0	CEVLV R4 FSW (CEV Upper Stage)	11/9/09	6/27/11
61	9.0	CEVLV FSW Build Support and Testing (R4)	11/9/09	6/27/11
62	9.0	CEVLV FSW Build Support and Testing	12/28/10	6/27/11
63	9.0	CEVLV FSW Critical Design Review 4 (CDR-4)	11/9/09	11/9/09
64	9.0	CEVLV Avionics Data Receipt (R4)	12/7/09	12/7/09
65	9.0	CEVLV Avionics Data Receipt (R4)	12/7/09	12/7/09
66	9.0	CEVLV Flight Software Receipt (R4)	2/1/10	2/1/10
67	9.0	CEVLV FSW Receipt (R4)	2/1/10	2/1/10
68	9.0	CEVLV Command and Telemetry Definition (R4)	12/8/09	4/12/10
69	9.0	CEVLV Telemetry Analysis and Selection (R4)	12/8/09	4/12/10
70	9.0	CEVLV Command Analysis and Build (R4)	12/8/09	4/12/10
71	9.0	CEVLV R5 FSW (Cargo)	5/10/10	12/28/11
72	9.0	CEVLV FSW Build Support and Testing (R5)	5/10/10	12/28/11
73	9.0	CEVLV FSW Build Support and Testing	6/28/11	12/28/11
74	9.0	CEVLV FSW Critical Design Review 5 (CDR-5)	5/10/10	5/10/10
75	9.0	CEVLV Avionics Data Receipt (R5)	6/7/10	6/7/10
76	9.0	CEVLV Avionics Data Receipt (R5)	6/7/10	6/7/10
77	9.0	CEVLV Flight Software Receipt (R5)	8/2/10	8/2/10
78	9.0	CEVLV FSW Receipt (R5)	8/2/10	8/2/10
79	9.0	CEVLV Command and Telemetry Definition (R6)	8/8/10	8/30/10
80	9.0	CEVLV Telemetry Analysis and Selection (R6)	8/8/10	8/30/10
81	9.0	CEVLV Command Analysis and Build (R6)	6/8/10	8/30/10
82	9.0	CEVLV R6 FSW (Human Rating)	5/10/10	12/28/11
83	9.0	CEVLV FSW Build Support and Testing (R6)	5/10/10	12/28/11
84	9.0	CEVLV FSW Build Support and Testing	6/28/11	12/28/11
85	9.0	CEVLV FSW Critical Design Review 6 (CDR-6)	5/10/10	5/10/10
86	9.0	CEVLV Avionics Data Receipt (R6)	6/7/10	6/7/10
87	9.0	CEVLV Avionics Data Receipt (R6)	6/7/10	6/7/10
88	9.0	CEVLV Flight Software Receipt (R6)	8/2/10	8/2/10
89	9.0	CEVLV FSW Receipt (R6)	8/2/10	8/2/10
90	9.0	CEVLV Command and Telemetry Definition (R6)	6/8/10	10/11/10
91	9.0	CEVLV Telemetry Analysis and Selection (R6)	6/8/10	10/11/10
92	9.0	CEVLV Command Analysis and Build (R6)	6/8/10	10/11/10
93	9.0	CEVLV Flight Software (FSW) Analysis and Development Support	5/30/07	6/28/11
94	9.0	CEV R1 FSW (Preliminary)	5/30/07	4/20/09
95	9.0	CEV FSW Design Support (R1)	5/30/07	8/26/08
96	9.0	CEV FSW Preliminary Design Review (PDR)	5/30/07	5/30/07

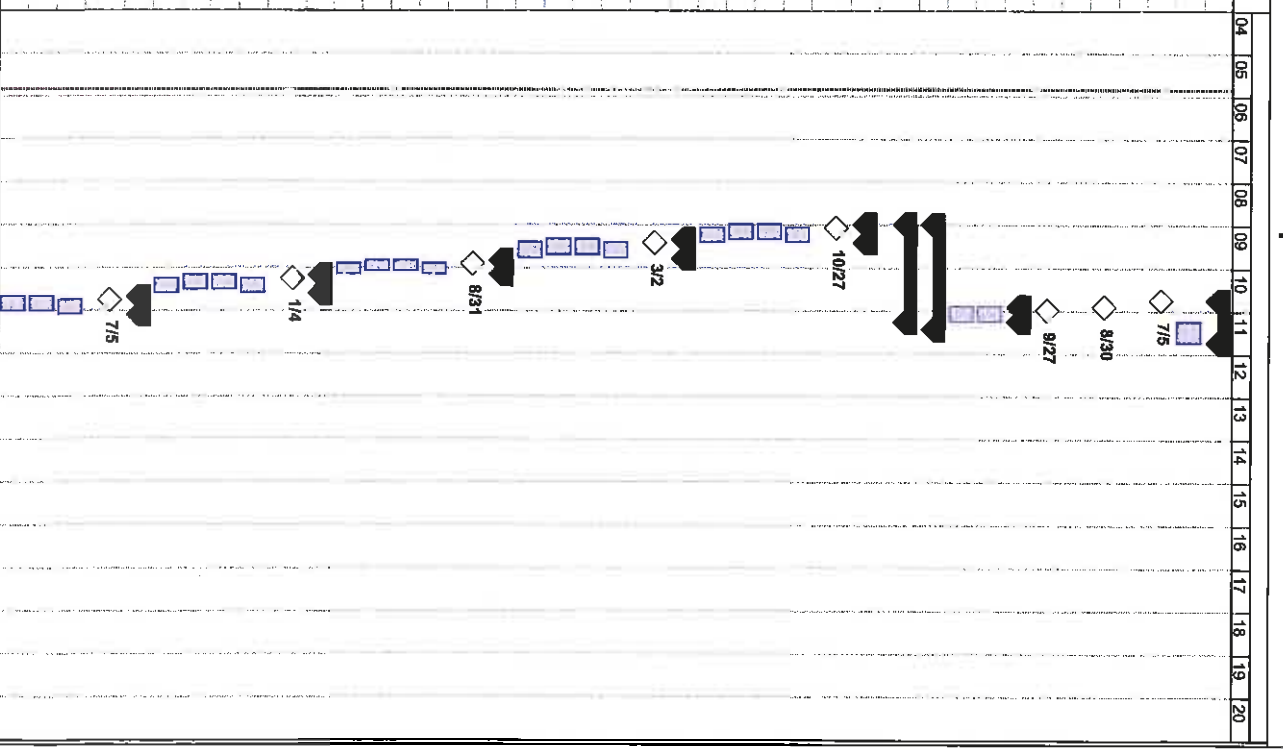
ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
97	9.0	CEV FSW Design Support	5/30/07	8/26/08																	
98	9.0	CEV FSW Critical Design Review 1 (CDR-1)	8/26/08	8/26/08																	
99	9.0	CEV Avionics Data Receipt (R1)	10/20/08	10/20/08																	
100	9.0	CEV Avionics Data Receipt (R1)	10/20/08	10/20/08																	
101	9.0	CEV Flight Software Receipt (R1)	11/17/08	11/17/08																	
102	9.0	CEV FSW Receipt (R1)	11/17/08	11/17/08																	
103	9.0	CEV Command and Telemetry Definition (R1)	10/21/08	4/20/09																	
104	9.0	CEV Telemetry Analysis and Selection (R1)	10/21/08	4/20/09																	
105	9.0	CEV Command Analysis and Build (R1)	10/21/08	4/20/09																	
106	9.0	CEV R2 FSW (Developmental 1)	8/27/08	11/9/09																	
107	9.0	CEV FSW Build Support and Testing (R2)	8/27/08	8/4/09																	
108	9.0	CEV FSW Build Support and Testing	8/27/08	8/4/09																	
109	9.0	CEV FSW Critical Design Review 2 (CDR-2)	5/11/09	5/11/09																	
110	9.0	CEV Avionics Data Receipt (R2)	7/6/09	7/6/09																	
111	9.0	CEV Avionics Data Receipt (R2)	7/6/09	7/6/09																	
112	9.0	CEV Flight Software Receipt (R2)	8/3/09	8/3/09																	
113	9.0	CEV FSW Receipt (R2)	8/3/09	8/3/09																	
114	9.0	CEV Command and Telemetry Definition (R2)	7/7/09	11/9/09																	
115	9.0	CEV Telemetry Analysis and Selection (R2)	7/7/09	11/9/09																	
116	9.0	CEV Command Analysis and Build (R2)	7/7/09	11/9/09																	
117	9.0	CEV R3 FSW (Developmental 2)	8/5/09	7/13/10																	
118	9.0	CEV FSW Build Support and Testing (R3)	8/5/09	7/13/10																	
119	9.0	CEV FSW Build Support and Testing	8/5/09	7/13/10																	
120	9.0	CEV FSW Critical Design Review 3 (CDR-3)	11/9/09	11/9/09																	
121	9.0	CEV Avionics Data Receipt (R3)	1/4/10	1/4/10																	
122	9.0	CEV Avionics Data Receipt (R3)	1/4/10	1/4/10																	
123	9.0	CEV Flight Software Receipt (R3)	2/1/10	2/1/10																	
124	9.0	CEV FSW Receipt (R3)	2/1/10	2/1/10																	
125	9.0	CEV Command and Telemetry Definition (R3)	4/8/10	5/10/10																	
126	9.0	CEV Telemetry Analysis and Selection (R3)	1/5/10	5/10/10																	
127	9.0	CEV Command Analysis and Build (R3)	1/5/10	5/10/10																	
128	9.0	CEV R4 FSW (CEV Orbital Operations)	3/15/10	1/4/11																	
129	9.0	CEV FSW Build Support and Testing (R4)	3/15/10	1/4/11																	
130	9.0	CEV FSW Build Support and Testing	7/14/10	1/4/11																	
131	9.0	CEV FSW Critical Design Review 4 (CDR-4)	3/15/10	3/15/10																	
132	9.0	CEV Avionics Data Receipt (R4)	5/10/10	5/10/10																	
133	9.0	CEV Avionics Data Receipt (R4)	5/10/10	5/10/10																	
134	9.0	CEV Flight Software Receipt (R4)	6/7/10	6/7/10																	
135	9.0	CEV FSW Receipt (R4)	6/7/10	6/7/10																	
136	9.0	CEV Command and Telemetry Definition (R4)	5/11/10	8/2/10																	
137	9.0	CEV Telemetry Analysis and Selection (R4)	5/11/10	8/2/10																	
138	9.0	CEV Command Analysis and Build (R4)	5/11/10	8/2/10																	
139	9.0	CEV R5 FSW (Human Rating)	7/5/10	6/28/11																	



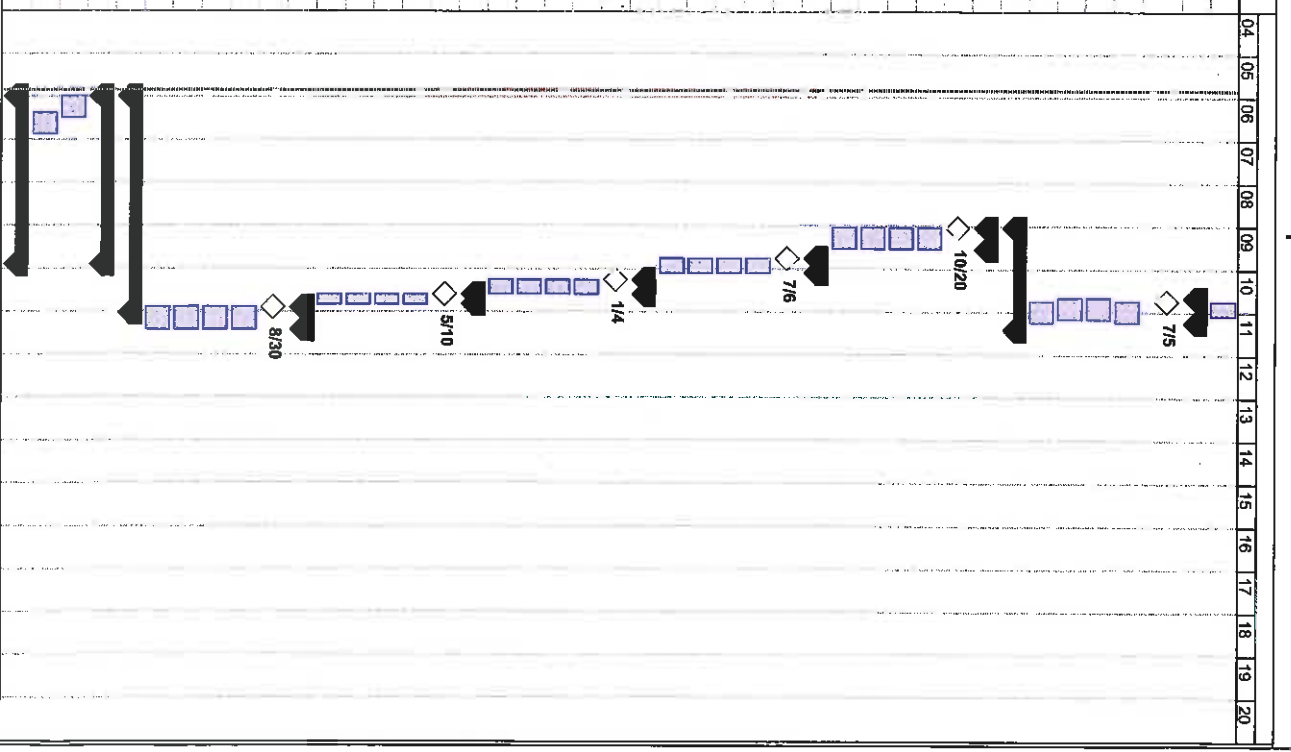
ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog	Name	Start	Finish	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
140	9.0	CEV FSW Build Support and Testing (R5)	7/5/10	6/28/11																		
141	9.0	CEV FSW Build Support and Testing	1/5/11	6/28/11																		
142	9.0	CEV FSW Critical Design Review 5 (CDR-5)	7/6/10	7/5/10																		
143	9.0	CEV Avionics Data Receipt (R5)	8/30/10	8/30/10																		
144	9.0	CEV Avionics Data Receipt (R5)	8/30/10	8/30/10																		
145	9.0	CEV Flight Software Receipt (R5)	9/27/10	9/27/10																		
146	9.0	CEV FSW Receipt (R5)	9/27/10	9/27/10																		
147	9.0	CEV Command and Telemetry Definition (R5)	8/31/10	1/3/11																		
148	9.0	CEV Telemetry Analysis and Selection (R5)	8/31/10	1/3/11																		
149	9.0	CEV Command Analysis and Build (R5)	8/31/10	1/3/11																		
150	9.0	Operational Requirements and Constraints Definition	9/30/08	3/7/11																		
151	8.0	CEV Launch Vehicle (CEV/LV) Ops Requirements and Constraints Definition	9/30/08	1/3/11																		
152	9.0	CEV/LV Ops Definition Cycle 1 (Preliminary)	9/30/08	3/2/09																		
153	9.0	CEV/LV Operational Requirements and Constraints Documentation	10/27/08	10/27/08																		
154	9.0	Basic Flight Techniques and Mission Timeline Development	10/28/08	3/2/09																		
155	9.0	Flight Rules Development	9/30/08	2/2/09																		
156	9.0	Procedures Development	9/30/08	2/2/09																		
157	9.0	Operations Documentation	10/28/08	3/2/09																		
158	9.0	CEV/LV Ops Definition Cycle 2 (Suborbital)	2/3/09	7/13/09																		
159	9.0	CEV/LV Operational Requirements and Constraints Documentation	3/2/09	3/2/09																		
160	9.0	Basic Flight Techniques and Mission Timeline Development	3/3/09	7/13/09																		
161	9.0	Flight Rules Development	2/3/09	6/15/09																		
162	9.0	Procedures Development	2/3/09	6/15/09																		
163	9.0	Operations Documentation	3/3/09	7/13/09																		
164	9.0	CEV/LV Ops Definition Cycle 3 (LV Stage)	8/4/09	11/30/09																		
165	9.0	CEV/LV Operational Requirements and Constraints Documentation	8/31/09	8/31/09																		
166	9.0	Basic Flight Techniques and Mission Timeline Development	9/1/09	11/30/09																		
167	9.0	Flight Rules Development	8/4/09	11/2/09																		
168	9.0	Procedures Development	8/4/09	11/2/09																		
169	9.0	Operations Documentation	9/1/09	11/30/09																		
170	9.0	CEV/LV Ops Definition Cycle 4 (CEV Upper Stage)	12/8/09	5/16/10																		
171	9.0	CEV/LV Operational Requirements and Constraints Documentation	1/4/10	1/4/10																		
172	9.0	Basic Flight Techniques and Mission Timeline Development	1/5/10	5/10/10																		
173	9.0	Flight Rules Development	12/8/09	4/12/10																		
174	9.0	Procedures Development	12/8/09	4/12/10																		
175	9.0	Operations Documentation	1/5/10	5/10/10																		
176	9.0	CEV/LV Ops Definition Cycle 5 (Cargo)	6/8/10	11/8/10																		
177	9.0	CEV/LV Operational Requirements and Constraints Documentation	7/5/10	7/5/10																		
178	9.0	Basic Flight Techniques and Mission Timeline Development	7/6/10	11/8/10																		
179	9.0	Flight Rules Development	6/8/10	10/11/10																		
180	9.0	Procedures Development	6/8/10	10/11/10																		



ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish
181	9.0	Operations Documentation	7/6/10	11/8/10
182	9.0	CEV/V Ops Definition Cycle 6 (Human Rating)	6/8/10	1/31/11
183	9.0	CEV/V Operational Requirements and Constraints Documentation	7/5/10	7/5/10
184	9.0	Basic Flight Techniques and Mission Timeline Development	7/6/10	1/31/11
185	9.0	Flight Rules Development	6/8/10	12/6/10
186	9.0	Procedures Development	6/8/10	12/6/10
187	9.0	Operations Documentation	7/6/10	1/31/11
188	9.0	CEV Ops Requirements and Constraints Definition	10/20/08	3/7/11
189	9.0	CEV Ops Definition Cycle 1 (Preliminary)	10/20/08	4/20/09
190	9.0	CEV Operational Requirements and Constraints Documentation	10/20/08	10/20/08
191	9.0	Basic Flight Techniques and Mission Timeline Development	10/21/08	4/20/09
192	9.0	Flight Rules Development	10/21/08	4/20/09
193	9.0	Procedures Development	10/21/08	4/20/09
194	9.0	Operations Documentation	10/21/08	4/20/09
195	9.0	CEV Ops Definition Cycle 2 (Developmental 1)	7/6/09	11/9/09
196	9.0	CEV Operational Requirements and Constraints Documentation	7/6/09	7/6/09
197	9.0	Basic Flight Techniques and Mission Timeline Development	7/7/09	11/9/09
198	9.0	Flight Rules Development	7/7/09	11/9/09
199	9.0	Procedures Development	7/7/09	11/9/09
200	9.0	Operations Documentation	7/7/09	11/9/09
201	9.0	CEV Ops Definition Cycle 3 (Developmental 2)	1/4/10	5/10/10
202	9.0	CEV Operational Requirements and Constraints Documentation	1/4/10	1/4/10
203	9.0	Basic Flight Techniques and Mission Timeline Development	1/5/10	5/10/10
204	9.0	Flight Rules Development	1/5/10	5/10/10
205	9.0	Procedures Development	1/5/10	5/10/10
206	9.0	Operations Documentation	1/5/10	5/10/10
207	9.0	CEV Ops Definition Cycle 4 (CEV Orbital Operations)	5/10/10	8/22/10
208	9.0	CEV Operational Requirements and Constraints Documentation	5/10/10	5/10/10
209	9.0	Basic Flight Techniques and Mission Timeline Development	5/11/10	8/22/10
210	9.0	Flight Rules Development	5/11/10	8/22/10
211	9.0	Procedures Development	5/11/10	8/22/10
212	9.0	Operations Documentation	5/11/10	8/22/10
213	9.0	CEV Ops Definition Cycle 5 (Human Rating)	8/30/10	3/7/11
214	9.0	CEV Operational Requirements and Constraints Documentation	8/30/10	8/30/10
215	9.0	Basic Flight Techniques and Mission Timeline Development	8/31/10	3/7/11
216	9.0	Flight Rules Development	8/31/10	3/7/11
217	9.0	Procedures Development	8/31/10	3/7/11
218	9.0	Operations Documentation	8/31/10	3/7/11
219	9.0	Mission Operations Facility Development	10/3/05	10/18/10
220	9.0	Integrated Planning System (IPS) Facility Development	10/3/05	8/31/09
221	9.0	IPS Requirements Definition	10/3/05	3/31/06
222	9.0	IPS Interface Specification	2/20/08	8/18/06
223	9.0	IPS Applications Development	10/3/05	8/31/09



ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
224	9.0	Platform Processing Applications	10/2/06	6/29/07																	
225	9.0	Flight Support User Applications	10/3/05	8/31/09																	
226	9.0	Flight Design Applications	10/3/05	9/26/08																	
227	9.0	Planning Applications	10/3/05	9/26/08																	
228	9.0	Telemetry Support Applications	8/5/08	8/31/09																	
229	9.0	Command Build Applications	8/5/08	8/31/09																	
230	9.0	IPS System Testing	7/2/07	8/31/09																	
231	9.0	IPS Platform Testing	7/2/07	9/7/07																	
232	9.0	IPS Flight Support Testing	9/29/06	8/31/09																	
233	9.0	IPS Flight Design Applications Testing	9/29/08	3/27/09																	
234	9.0	IPS Planning Applications Testing	9/29/08	3/27/09																	
235	9.0	Telemetry Product Generation and Reconfiguration Testing	3/3/09	8/31/09																	
236	9.0	Command Product Generation and Reconfiguration Testing	3/3/09	8/31/09																	
237	9.0	IPS Facility Ready	8/31/09	8/31/09																	
238	9.0	Training Facility Development	10/3/05	10/18/10																	
239	9.0	Training Facility Requirements Definition	10/3/05	3/31/06																	
240	9.0	Training Facility Interface Specification	2/20/06	8/18/06																	
241	9.0	Full Task Trainer (FTT)	10/2/06	10/18/10																	
242	9.0	FTT Facility Infrastructure Build	10/2/06	9/26/08																	
243	9.0	FTT Simulation Platform Build	10/2/06	9/26/08																	
244	9.0	FTT Crew Stations Build, Delivery, and Hardware Integration	10/1/07	9/26/08																	
245	9.0	FTT External Interfaces	3/31/08	9/26/08																	
246	9.0	Simulation Software Receipt (Developmental)	5/27/08	8/26/08																	
247	9.0	CEV Launch Vehicle FTT Sim Software Receipt (Developmental)	5/27/08	5/27/08																	
248	9.0	CEV FTT Sim Software Receipt (Developmental)	8/26/08	8/26/08																	
249	9.0	Avionics Data Receipt (Developmental)	5/13/09	9/29/09																	
250	9.0	CEV Launch Vehicle Avionics Data Receipt (Developmental)	9/29/09	8/29/09																	
251	9.0	CEV Avionics Data Receipt (Developmental)	5/13/09	5/13/09																	
252	9.0	Avionics Reconfiguration Products Receipt (Test)	8/31/09	8/31/09																	
253	9.0	Telemetry Reconfiguration Products Receipt (Test)	8/31/09	8/31/09																	
254	9.0	Command Reconfiguration Products Receipt (Test)	8/31/09	8/31/09																	
255	9.0	Flight Software Receipt (Developmental)	11/17/06	11/24/08																	
256	9.0	CEV Launch Vehicle FSW Receipt (Developmental)	11/24/08	11/24/08																	
257	9.0	CEV FSW Receipt (Developmental)	11/17/08	11/17/08																	
258	9.0	FTT Hardware and Software Integration and Test	6/30/09	4/19/10																	
259	9.0	FTT Sim Software, Avionics Data, and FSW Integration With Platform	6/30/09	3/8/10																	
260	9.0	FTT Displays Integration With Platform	7/14/09	4/18/10																	
261	9.0	FTT System Testing	4/20/10	10/18/10																	
262	9.0	Standalone FTT Testing	4/20/10	10/18/10																	
263	9.0	Testing FTT Integration With MCC	8/10/10	10/18/10																	
264	9.0	FTT Facility Ready	10/18/10	10/18/10																	
265	9.0	Part Task Trainer (PTT)	10/2/06	5/4/09																	
266	9.0	PTT Platform Infrastructure Build	10/2/06	9/28/07																	

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ESAS Integrated Master Schedule - 1.5 Launch Option

ID	Prog WBS	Name	Start	Finish	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
267	9.0	Simulation Software Receipt (Developmental)	9/2/08	9/2/08																		
268	9.0	CEV Launch Vehicle-PTT Sim Software Receipt (Developmental)	9/2/08	9/2/08																		
269	9.0	CEV PTT Sim Software Receipt (Developmental)	9/2/08	9/2/08																		
270	9.0	PTT Hardware and Software Integration and Test	9/2/08	3/2/09																		
271	9.0	PTT Sim Software Integration With Platform	9/2/08	3/2/09																		
272	9.0	PTT Displays Integration With Platform	9/2/08	1/5/09																		
273	9.0	PTT System Testing	3/3/09	5/4/09																		
274	9.0	PTT Facility Ready	5/4/09	5/4/09																		
275	9.0	Mockup Training Facility	10/2/06	3/27/09																		
276	9.0	CEV Mockup	10/2/06	9/28/07																		
277	9.0	Cargo Vehicle Mockup	7/2/07	3/27/08																		
278	9.0	Un-pressurized Cargo Vehicle Mockup	7/2/07	8/27/08																		
279	9.0	Pressurized Cargo Vehicle Mockup	3/31/08	3/27/09																		
280	9.0	Mockup Training Facility Ready	3/27/09	3/27/09																		
281	9.0	Mission Control Center (MCC) Facility Development	10/3/05	10/18/10																		
282	9.0	MCC Requirements Definition	10/3/05	3/31/06																		
283	9.0	MCC Interface Specification	2/20/06	8/18/06																		
284	9.0	MCC Facility Modifications	7/23/07	5/10/10																		
285	9.0	CEV Command Server Integration	5/12/09	5/10/10																		
286	9.0	CEV Front End Processor (FEP)	7/23/07	1/18/09																		
287	9.0	FEP Receipt	7/23/07	7/23/07																		
288	9.0	FEP Integration	7/23/07	1/18/09																		
289	9.0	Avionics Reconfiguration Products Receipt (Test)	4/28/09	9/14/09																		
290	9.0	Telemetry Reconfiguration Products Receipt (Test)	4/28/09	9/14/09																		
291	9.0	Command Reconfiguration Products Receipt (Test)	4/28/09	9/14/09																		
292	9.0	MCC Applications Development	10/2/06	5/17/10																		
293	9.0	Platform Processing Applications	10/2/06	3/28/08																		
294	9.0	Real-time Trajectory Applications	10/2/06	12/26/08																		
295	9.0	Telemetry Processing User Applications	5/19/09	5/17/10																		
296	9.0	Command Processing User Applications	5/19/09	5/17/10																		
297	9.0	Operational Readiness Testing (ORT)	3/31/08	10/18/10																		
298	9.0	Platform Testing	3/31/08	9/26/08																		
299	9.0	Real-time Trajectory Applications	3/31/08	9/26/08																		
300	9.0	Telemetry Applications	8/18/09	2/15/10																		
301	9.0	Command Applications	8/18/09	2/15/10																		
302	9.0	User Application Certification	9/29/08	5/17/10																		
303	9.0	Real-time Trajectory Applications	9/29/08	12/26/08																		
304	9.0	Telemetry Application Certification	2/16/10	5/17/10																		
305	9.0	Command Application Certification	2/16/10	5/17/10																		
306	9.0	Flight Support Testing	2/16/10	10/18/10																		
307	9.0	Testing MCC With CEV Avionics Verification Facility	2/16/10	8/16/10																		
308	9.0	Testing MCC Integration With CEV FTTs	8/10/10	10/18/10																		
309	9.0	MCC Facility Ready	6/15/09	10/18/10																		

7/28/05

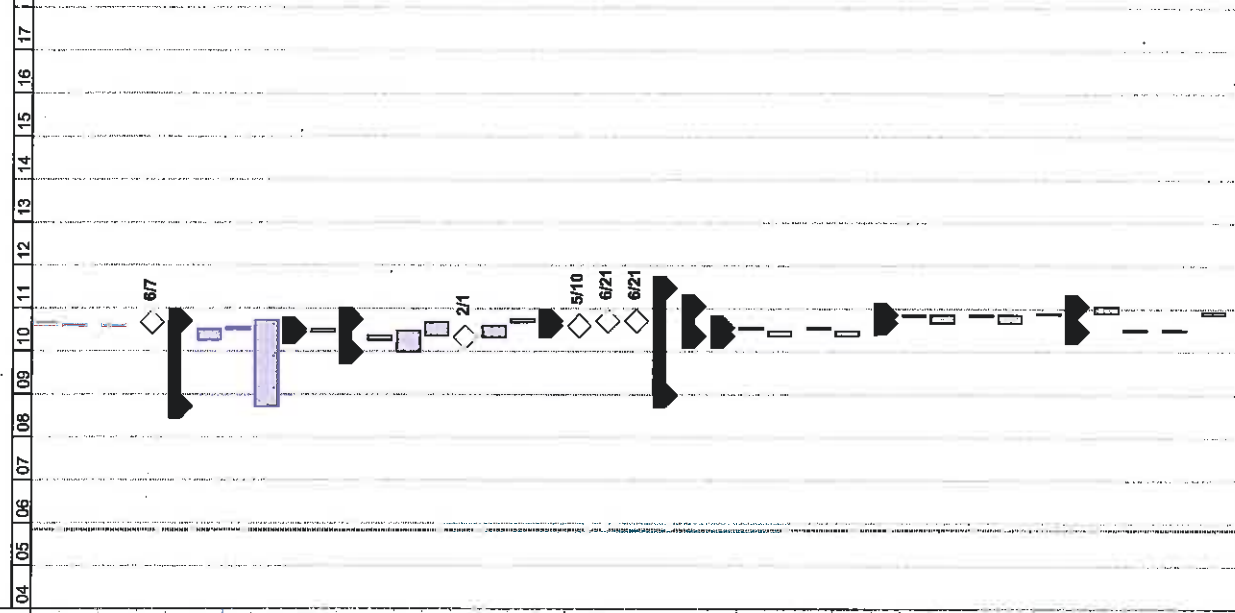
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ID	Prog WBS	Name	Start	Finish
310	9.0	MCC Preliminary Monitoring Capability (CEV-1)	6/15/09	6/15/09
311	9.0	MCC Preliminary Commanding Capability (CEV-1)	6/15/09	6/15/09
312	9.0	MCC Telemetry Monitoring Ready	6/22/10	6/22/10
313	9.0	MCC Command Capability Ready	6/22/10	6/22/10
314	9.0	MCC Verified for Flight Support	10/18/10	10/18/10
315	9.0	Mission Operations Production and Flight Support	6/24/08	7/18/11
316	9.0	CEV Launch Vehicle (CEVLV) Test Flight 1 (CEV-1)	7/15/08	3/1/10
317	9.0	MCC Prep For Flight [R2]	4/7/09	6/15/09
318	9.0	CEVLV MCC Support Preparations	4/7/09	5/18/09
319	9.0	CEVLV Telemetry Product Generation	5/5/09	5/18/09
320	9.0	Flight Specific CEVLV Telemetry Display and Application Development	4/7/09	5/18/09
321	9.0	CEVLV Command Product Generation	5/5/09	5/18/09
322	9.0	Flight Specific CEVLV Command Display and Application Development	4/7/09	5/18/09
323	9.0	MCC Data Reconfiguration Product Integration	5/19/09	6/1/09
324	9.0	MCC Testing	5/19/09	6/15/09
325	9.0	MCC Operational Readiness Testing (ORT)	6/2/09	6/15/09
326	9.0	Flight Specific CEVLV Telemetry Display and Application Certification	5/19/09	6/1/09
327	9.0	Flight Specific CEVLV Command Display and Application Certification	5/19/09	6/1/09
328	9.0	MCC Ready For Flight	6/15/09	6/15/09
329	9.0	Flight Design [R2]	7/15/08	7/13/09
330	9.0	Flight Specific CEVLV Display and Application Development	3/3/09	6/1/09
331	9.0	Flight Specific CEVLV Display and Application Certification	6/2/09	6/22/09
332	9.0	Flight Analysis and Design	7/15/08	7/13/09
333	9.0	Procedure Verification (PV) [R2]	5/19/09	6/15/09
334	9.0	Flight Specific CEVLV PV Training [R2]	5/19/09	6/15/09
335	9.0	Training [R2]	3/3/09	3/1/10
336	9.0	Training Plan Development	3/3/09	4/13/09
337	9.0	Flight Controller Training Via participation in FSW Testing	9/1/09	3/1/10
338	9.0	Operations Reviews	7/13/09	3/1/10
339	9.0	Flight Operations Review (FOR)	7/13/09	7/13/09
340	9.0	Flight Readiness Review (FRR)	3/1/10	3/1/10
341	9.0	CEV-1 (No crew, suborbital, LV CMD & TLM)	3/1/10	3/1/10
343	9.0	CEV Launch Vehicle (CEVLV) Test Flight 2 (CEV-2)	6/24/08	7/15/10
344	9.0	MCC Prep For Flight [R4]	2/16/10	6/7/10
345	9.0	CEVLV MCC Support Preparations	2/16/10	4/26/10
346	9.0	CEVLV Telemetry Product Generation	4/13/10	4/26/10
347	9.0	Flight Specific CEVLV Telemetry Display and Application Development	2/16/10	4/26/10
348	9.0	CEVLV Command Product Generation	4/13/10	4/26/10
349	9.0	Flight Specific CEVLV Command Display and Application Development	2/16/10	4/26/10
350	9.0	MCC Data Reconfiguration Product Integration	4/27/10	5/10/10
351	9.0	MCC Testing	4/27/10	6/7/10

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ID	Prog WBS	Name	Start	Finish
352	9.0	MCC Operational Readiness Testing (ORT)	5/11/10	6/7/10
353	9.0	Flight Specific CEVLV Telemetry Display and Application Certification	4/27/10	5/17/10
354	9.0	Flight Specific CEVLV Command Display and Application Certification	4/27/10	5/17/10
355	9.0	MCC Ready For Flight	6/7/10	6/7/10
356	9.0	Flight Design [R4]	6/24/08	6/21/10
357	9.0	Flight Specific CEVLV Display and Application Development	1/5/10	4/5/10
358	9.0	Flight Specific CEVLV Display and Application Certification	4/6/10	4/26/10
359	9.0	Flight Analysis and Design	6/24/08	6/21/10
360	9.0	Procedure Verification (PV) [R4]	3/16/10	4/12/10
361	9.0	Flight Specific CEVLV PV Training [R4]	9/29/09	7/5/10
362	9.0	Training Plan Development	1/5/10	2/15/10
363	9.0	Flight Controller Training Via participation in FSW Testing [R4]	9/29/09	3/29/10
364	9.0	Flight Controller Training Via CEVLV Part Task Trainer (PTT) [R3]	2/16/10	6/7/10
365	9.0	PTT CEVLV Simulation Software Update For CEV-2 [R4]	2/1/10	2/1/10
366	9.0	PTT Simulation Software Update Integration	2/2/10	5/10/10
367	9.0	Flight Controller Training Via CEVLV PTT [R4]	6/8/10	7/5/10
368	9.0	Operations Reviews	5/10/10	6/21/10
369	9.0	Flight Operations Review (FOR)	5/10/10	5/10/10
370	9.0	Flight Readiness Review (FRR)	6/2/10	6/2/10
371	9.0	CEV-2 (No crew, orbital, LV CMD & TLM)	6/21/10	6/21/10
372	9.0	CEV Orbital Test Flight (CEV-3)	9/30/08	3/28/11
373	9.0	MCC Prep For Flight [LV-R4, CEV-R4]	2/16/10	10/25/10
374	9.0	CEVLV MCC Support Preparations	2/16/10	4/26/10
375	9.0	CEVLV Telemetry Product Generation	4/13/10	4/26/10
376	9.0	Flight Specific CEVLV Telemetry Display and Application Development	2/16/10	3/29/10
377	9.0	CEVLV Command Product Generation	4/13/10	4/26/10
378	9.0	Flight Specific CEVLV Command Display and Application Development	2/16/10	3/29/10
379	9.0	CEV MCC Support Preparations	6/8/10	8/16/10
380	9.0	CEV Telemetry Product Generation	8/3/10	8/16/10
381	9.0	Flight Specific CEV Telemetry Display and Application Development	6/8/10	8/16/10
382	9.0	CEV Command Product Generation	8/3/10	8/16/10
383	9.0	Flight Specific CEV Command Display and Application Development	6/8/10	8/16/10
384	9.0	MCC Data Reconfiguration Product Integration	8/17/10	8/30/10
385	9.0	MCC Testing	3/30/10	10/25/10
386	9.0	MCC Operational Readiness Testing (ORT)	8/31/10	10/25/10
387	9.0	Flight Specific CEVLV Telemetry Display and Application Certification	3/30/10	4/12/10
388	9.0	Flight Specific CEVLV Command Display and Application Certification	3/30/10	4/12/10
389	9.0	Flight Specific CEV Telemetry Display and Application Certification	8/17/10	9/13/10



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ID	Prog WBS	Name	Start	Finish
392	9.0	Flight Specific CEV Command Display and Application Certification	8/17/10	9/13/10
393	9.0	MCC Ready For Flight	10/25/10	10/25/10
394	9.0	Flight Design [LV-R4, CEV-R4]	9/30/08	3/28/11
395	9.0	Flight Specific CEV/VL Display and Application Development	1/5/10	3/1/10
396	9.0	Flight Specific CEV/VL Display and Application Certification	3/2/10	3/15/10
397	9.0	Flight Specific CEV Display and Application Development	5/11/10	8/9/10
398	9.0	Flight Specific CEV Display and Application Certification	8/10/10	8/30/10
399	9.0	Flight Analysis and Design	9/30/08	3/28/11
400	9.0	Procedure Verification (PV) [LV-R4, CEV-R4]	3/16/10	8/16/10
401	9.0	Flight Specific CEV/VL PV	3/16/10	4/5/10
402	9.0	Flight Specific CEV PV	7/8/10	8/16/10
403	9.0	Training [LV-R4, CEV-R4]	2/2/10	3/28/11
404	9.0	Training Plan Development	4/13/10	5/24/10
405	9.0	Flight Controller Training Via participation in CEV FSW Testing [R4]	2/2/10	9/13/10
406	9.0	Flight Controller Training Via Part Task Trainer (PTT) [R3]	5/25/10	9/13/10
407	9.0	PTT Simulation Software Update For CEV-3 [R4]	6/7/10	6/7/10
408	9.0	PTT CEV Simulation Software Update Integration	6/6/10	9/13/10
409	9.0	Flight Controller Training Via PTT Using CEV R4 Sim Software	9/14/10	3/14/11
410	9.0	Instructor Certification and Lesson Development	4/13/10	10/11/10
411	9.0	Full Task Trainer (FTT) CEV Simulation Software Update For CEV-3 (R4)	6/7/10	6/7/10
412	9.0	FTT Simulation Software Update Integration	6/6/10	10/11/10
413	9.0	Flight Controller Training Via FTT Using CEV R3 FSW	4/13/10	10/11/10
414	9.0	Flight Controller Training Via FTT Using CEV R4 FSW	10/12/10	3/28/11
415	9.0	Operations Reviews	8/16/10	3/28/11
416	9.0	Flight Operations Review (FOR)	8/16/10	8/16/10
417	9.0	Flight Readiness Review (FRR)	3/28/11	3/28/11
418	9.0	CEV-3 (No crew, orbital, LV CMD & TLM, CEV CMD & TLM)	3/28/11	3/28/11
420	9.0	MCC Prep For Flight [LV-R6, CEV-R5]	8/19/08	7/16/11
422	9.0	CEV/VL MCC Support Preparations	8/17/10	3/28/11
423	9.0	CEV/VL Telemetry Product Generation	8/17/10	10/25/10
424	9.0	Flight Specific CEV/VL Telemetry Display and Application Development	10/12/10	10/25/10
425	9.0	CEV/VL Command Product Generation	8/17/10	9/27/10
426	9.0	Flight Specific CEV/VL Command Display and Application Development	10/12/10	10/25/10
427	9.0	CEV MCC Support Preparations	8/17/10	9/27/10
428	9.0	CEV Telemetry Product Generation	1/18/10	1/17/11
429	9.0	Flight Specific CEV Telemetry Display and Application Development	1/4/11	1/17/11
430	9.0	CEV Command Product Generation	1/18/10	1/17/11
431	9.0	Flight Specific CEV Command Display and Application Development	1/19/10	1/17/11
432	9.0	MCC Data Reconfiguration Product Integration	1/18/11	1/31/11
433	9.0	MCC Testing	9/28/10	3/28/11

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