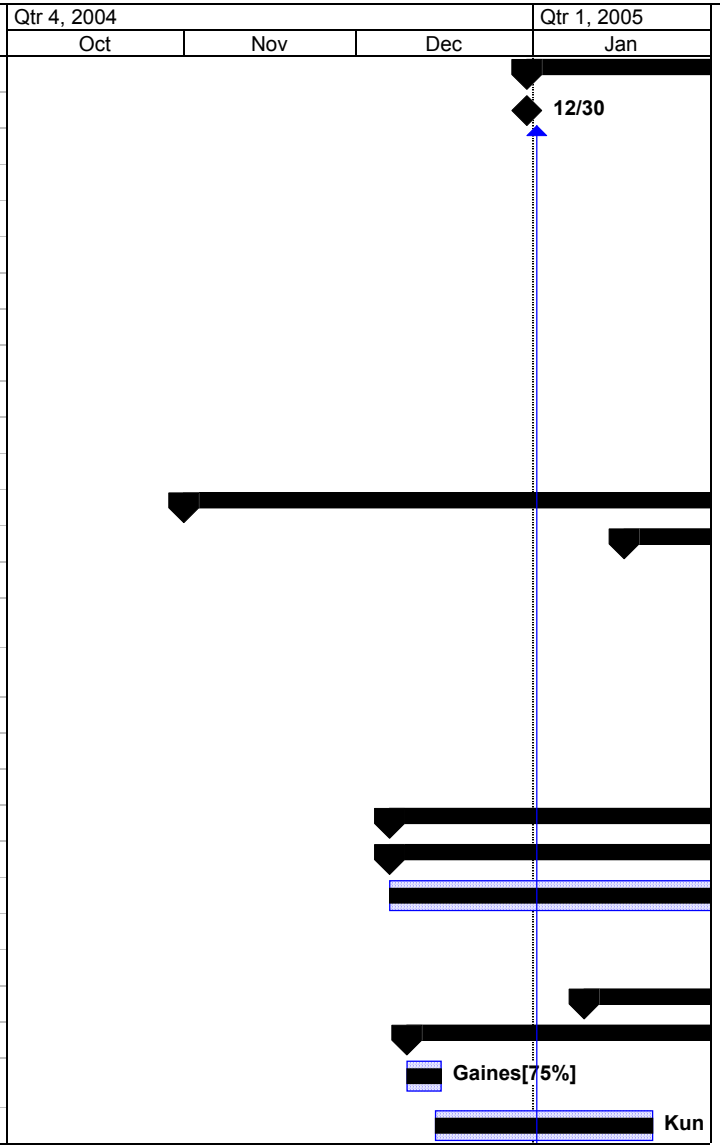
ID		Task Name	Duration
1		**CLARAty MSL Deliverables (FY05)**	**302 days**
2	✓	Panoramic to navigation camera tracking and handoff	0 days
3	✓	GESTALT navigation with ROAMS	0 days
4		GESTALT navigation with FIDO	0 days
5		Navigation to hazard camera tracking and handoff	0 days
6		6DOF EKF with integrated sun sensing on Rocky 8	0 days
7			
8		**CLARAty SOOPs Deliverables (FY05)**	**164 days**
9		Demonstration of digging with a Moonrise-like manipulator	0 days
10		Demonstration of navigation (with obstacle avoidance) with ROAMS and Maes	0 days
11		Demonstration of lander-based sampling with ROAMS	0 days
12			
13		**Technology Integration and Demonstration**	**446 days?**
14		**CLARAty Support for Moonrise Arm**	**125 days**
25		**CLARAty Support for SOOPS: long range traverse**	**75.56 days**
26		Update navigator to run with fixed mast or hazard cameras in ROAMS (SOOPS)	4 wks
27		Tune navigation parameters to improve autonomous operations in ROAMS (SOOPS)	1.11 mons
28		Test in multiple long-range traverse scenarios defined by scientist in ROA	1.11 mons
29		Train staff to use tool (Maestro/CLARAty/ROAMS) (SOOPS)	2.22 wks
30		**CLARAty Support for SOOPS: lander-based sampling**	**169 days**
36		**Navigation**	**183 days?**
37		**MER GESTALT**	**151 days**
38	✓	Test MER GESTALT on ROAMS	2.7 mons
39		Assist validation task with using GESTALT/ROAMS delivery	9 wks
40		Test MER Gestalt on FIDO	8.4 wks
41		**Drivemaps**	**159 days**
45		**Morphin**	**113 days?**
46	✓	Test out using Morphin in ROAMS with new CLARAty/ROAMS interface	4 days?
47	✓	Fix changes to navigation (made for K9) to work for other CLARAty r	28 days?



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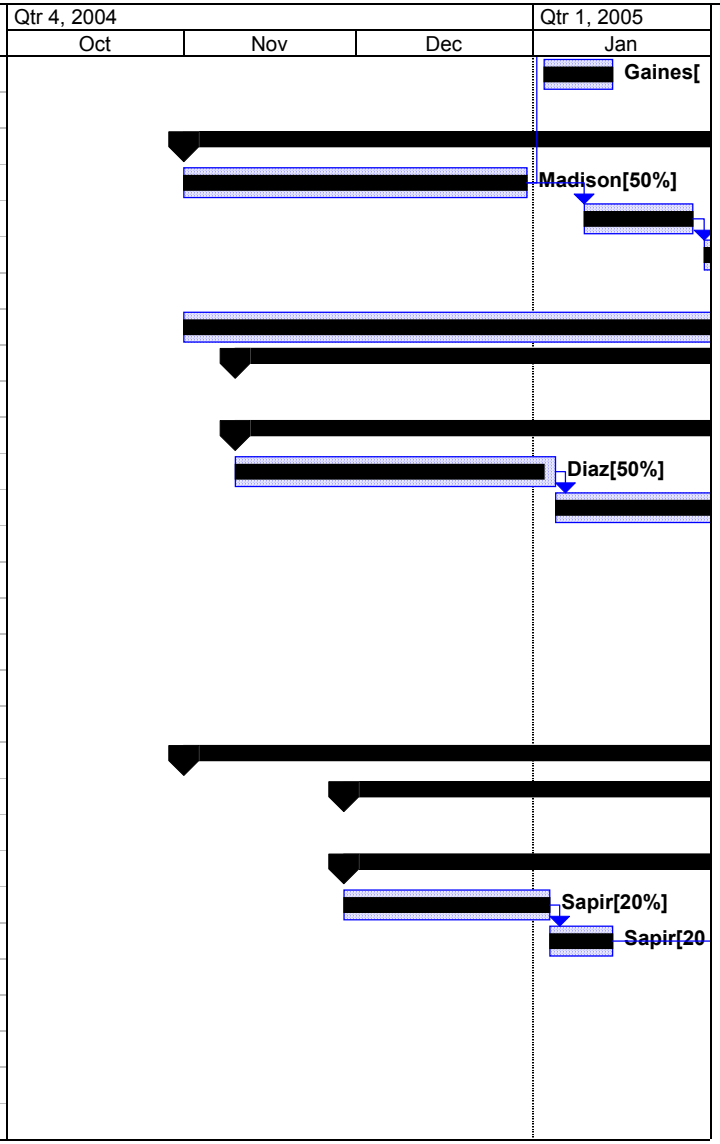
48	Checkin changes for using Morphin on FIDO and test with current re	10 days?
49	Fix bugs/problems identified in SCIP filming	8 wks
50	**Visual Tracking**	**155 days?**
51	Panoramic to navigation cameras tracking and handoff	44 days?
52	Incorporate additional changes requested from IP task	3 wks
53	Merge delivery tar ball with main repository branch	3 wks
54	Navigation to Hazard camera tracking and hand-off	15 wks
55	Re-film FY04 Level 1 milestone demonstration	110 days?
56	**Pose Estimation: 6DOF EKF**	**439 days?**
57	**Visual Odometry (discrete)**	**256 days**
62	**Sun Sensor**	**162 days?**
63	Develop error model	2 mons
64	Develop update function	1.15 mons
65	Refactor update function	1 mon
66	Test	9 days?
67	**6DOF Wheel Odometry**	**107 days**
72	**Characterize ISIS IMU**	**20 days**
76	**Integrate**	**30 days**
79	Development environment overhead	4 mons
80	**CLARAty Package Development**	**577 days?**
81	**Core**	**254.5 days?**
82	Review and update Time classes to be consistent and document	2 mons
83	**Develop an automated build, test and release process**	**82.5 days?**
84	Build base set of modules	26 days?
85	Update module dependencies	9 days?
86	Build full set of modules	3 wks
87	Create webpage that shows build process results	10 days?
88	Create end user documentation of auto build utility	5 days?
89	Develop a regression testing framework	3 wks
90	**Device and I/O**	**20 days**



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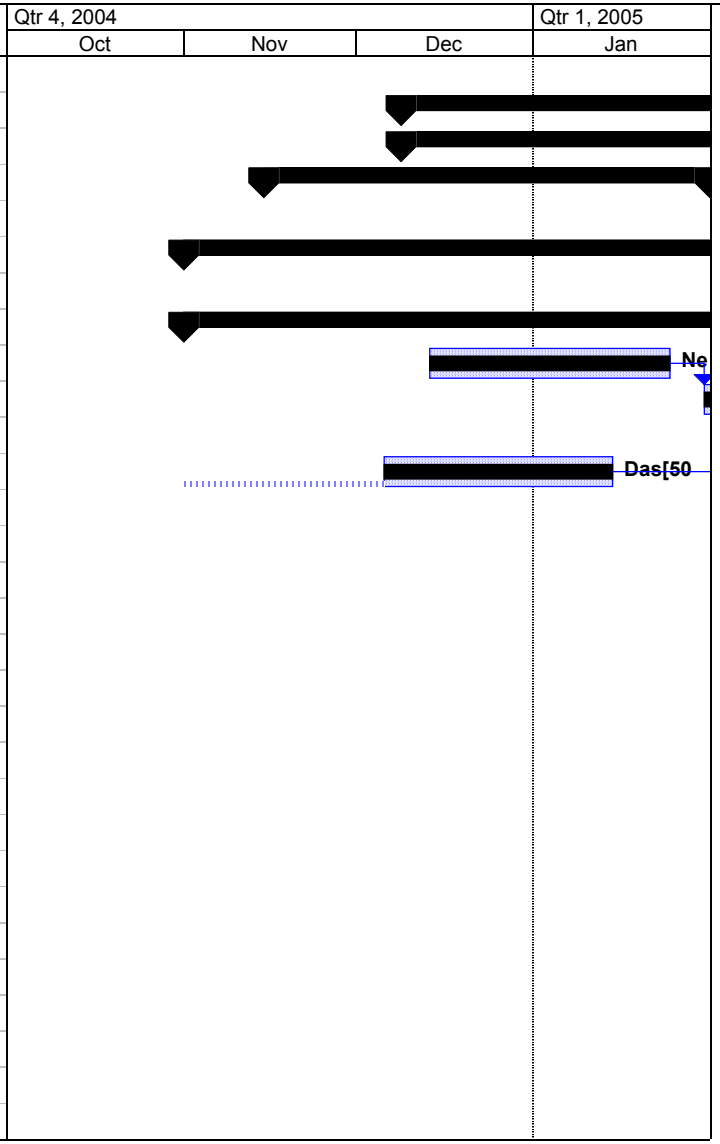
92		**Math Infra-structure**	**157.5 days**
100		**Software Infra-structure Improvements**	**212 days?**
108		**Documentation**	**222.56 days?**
116		**Estimation**	**56 days**
118		**Decision Layer**	**63 days**
121		**Motion Control, Mobility and Manipulation (M3)**	**577 days**
122		**Motion Control**	**80 days**
127		**Mechanism Modeling**	**577 days**
128	✓	Prepare requirement doc for internal review	1.5 mons
129	✓	Review requirements document	7 days
130		Capture and integrate reviewers feedback	1 mon
131	✓	Develop STL-like Tree class with capability for iteratin over subchain	6 wks
132	✓	Develop mechanical element body class to model rigid body types	2 wks
133		Develop mechanical element joint class to model joints and actuatior	3 wks
134	✓	Develop Mechanism_Model class to embody the above mechanical	2 wks
135		Interface the mechanism model with the CLARAty XML parser	2 wks
136	✓	Develop algorithms for converting between model formats (e.g., DH	3 wks
137		Develop generic algorithm and interface for forward kinematics	1 mon
138		Develop generic algorithm and interface for Jacobian	2 wks
139		Adapt mechanism model class to compute Jacobian for general rock	3 wks
140		Adapt simplified 2D kinematics for Rocky 8 model	4 wks
141		Develop algorithm for multi-dim non-linear constrained optimization p	1 mon
142		Develop models for dynamic constraint modeling and management	3 wks
143		Develop an approach for automatically interfacing model data structu	1 mon
144		Develop generic algorithm and interface for inverse kinematics	2 wks
145		Validate Mechanism_Model kinematics algorithms against MER IDD	3 mons
146		Define Collision detection generic classes	4 wks
147		Define geometric shape classes	8 mons
148		**Locomotion**	**40 days**
150		**Manipulation**	**40 days**



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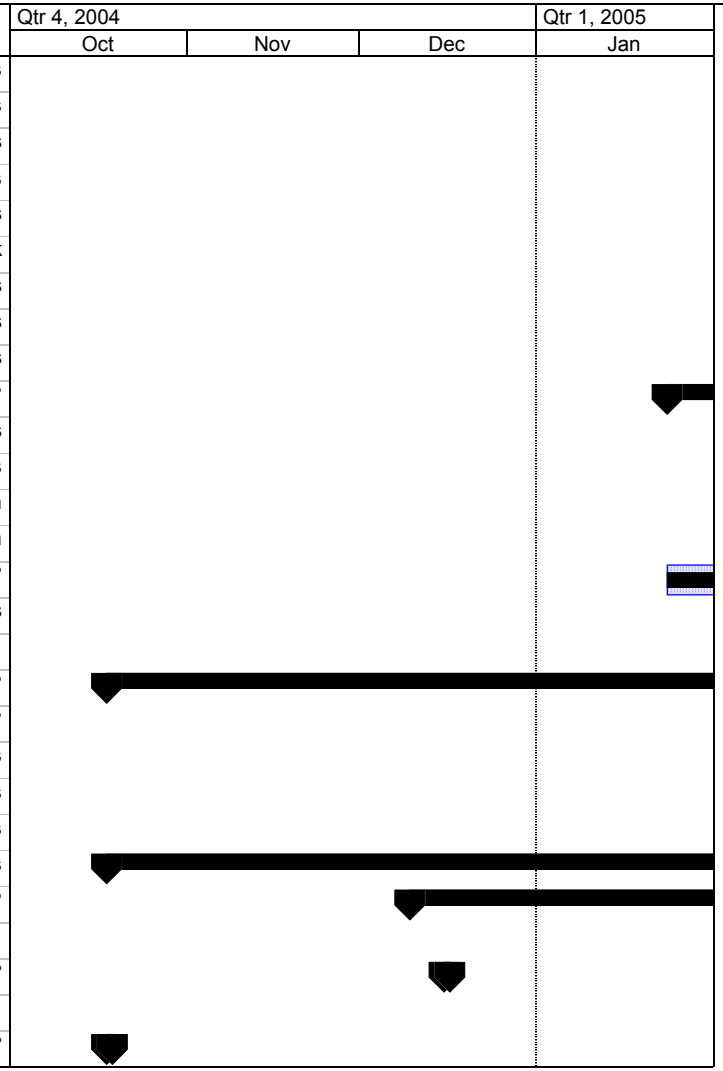
152	**Maestro**	**120 days**
154	**Navigation**	**10 days**
155	Update navigation classes to support new locomotor API	2 wks
156	**Rover**	**125 days**
157	Design and prototype mechanism for dynamic generation of rover classes	5 mons
158	Adapt to a real or simulated rover	1 wk
159	Test and review design	3 wks
160	Move power and energy estimation to appropriate sub-classes	4 wks
161	Clean up Rover control/query interface	3 days
162	**Vision**	**200 days?**
163	Merge dev_camera and camera classes	3 wks
164	Debug VO	1.5 mons
165	Move point stereo from r8_tracker to proper stereo module	1 mon
166	Provide conversion algorithm for TSAI to CAHVOR and vice versa	1 mon
167	Subclassing of Ames stereo	10 days?
168	Cleanup camera 1394 devices	2 mons
169		
170	**Rover Adaptation**	**500 days?**
171	**ATRV Jr.**	**21 days?**
174	**FIDO Rover**	**367 days**
181	**Rocky8 Rover**	**405 days**
189	**Rocky7 Rover**	**25 days**
192	**MAX Rover**	**200 days**
195	**ROAMS Rover Simulator**	**137 days?**
200		
201	**Captured but not Integrated**	**1 day?**
207		
208	**Color Legend**	**1 day?**



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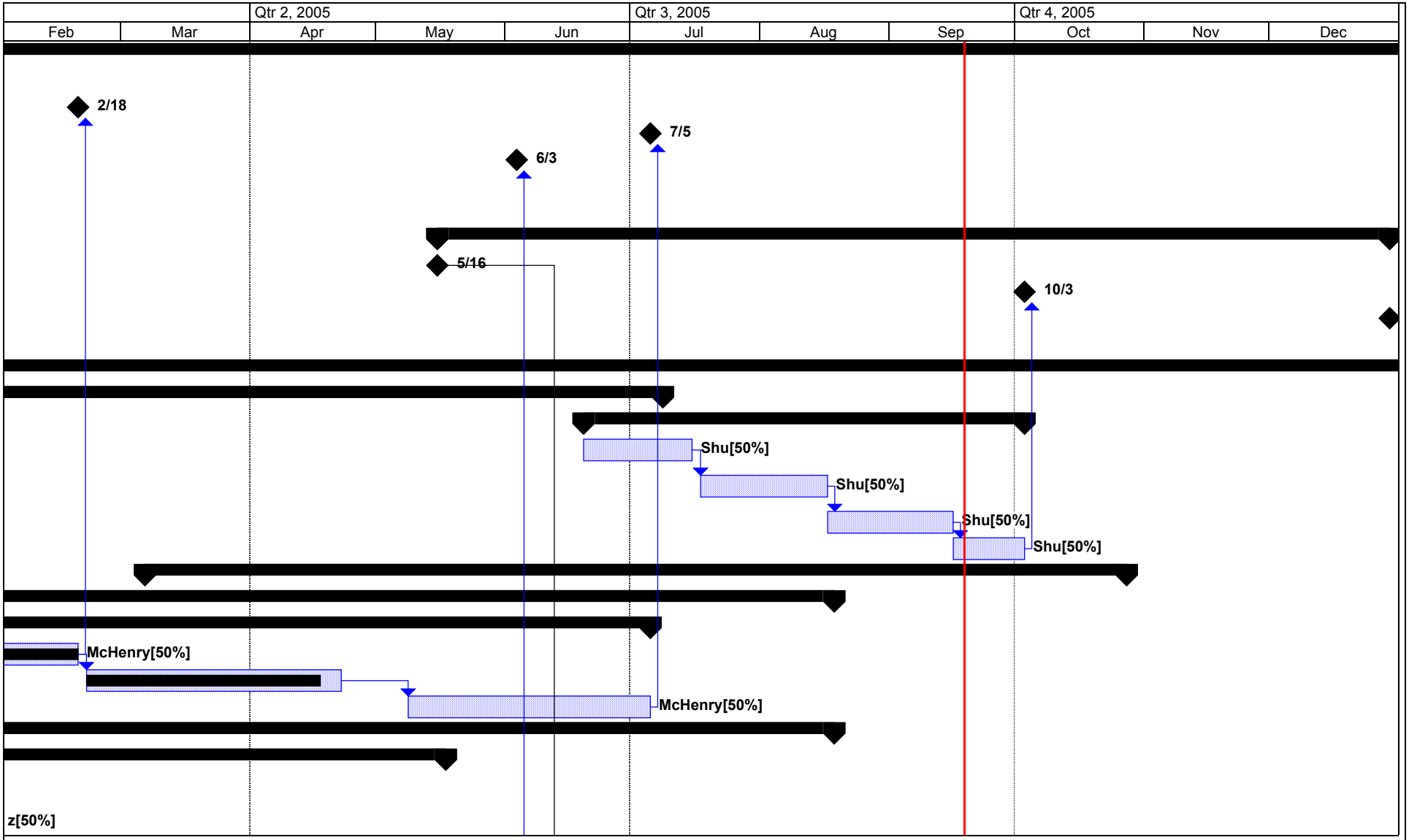

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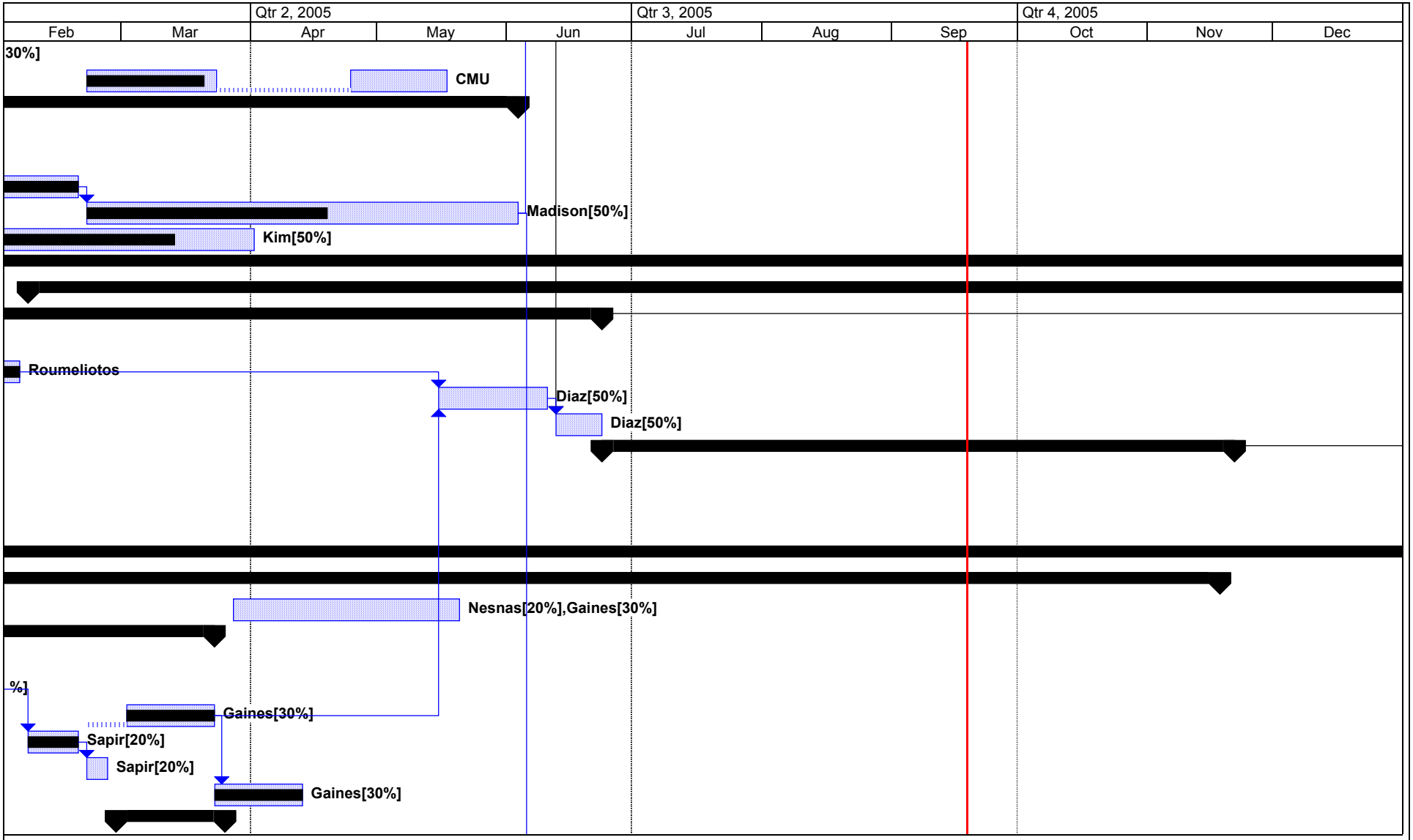

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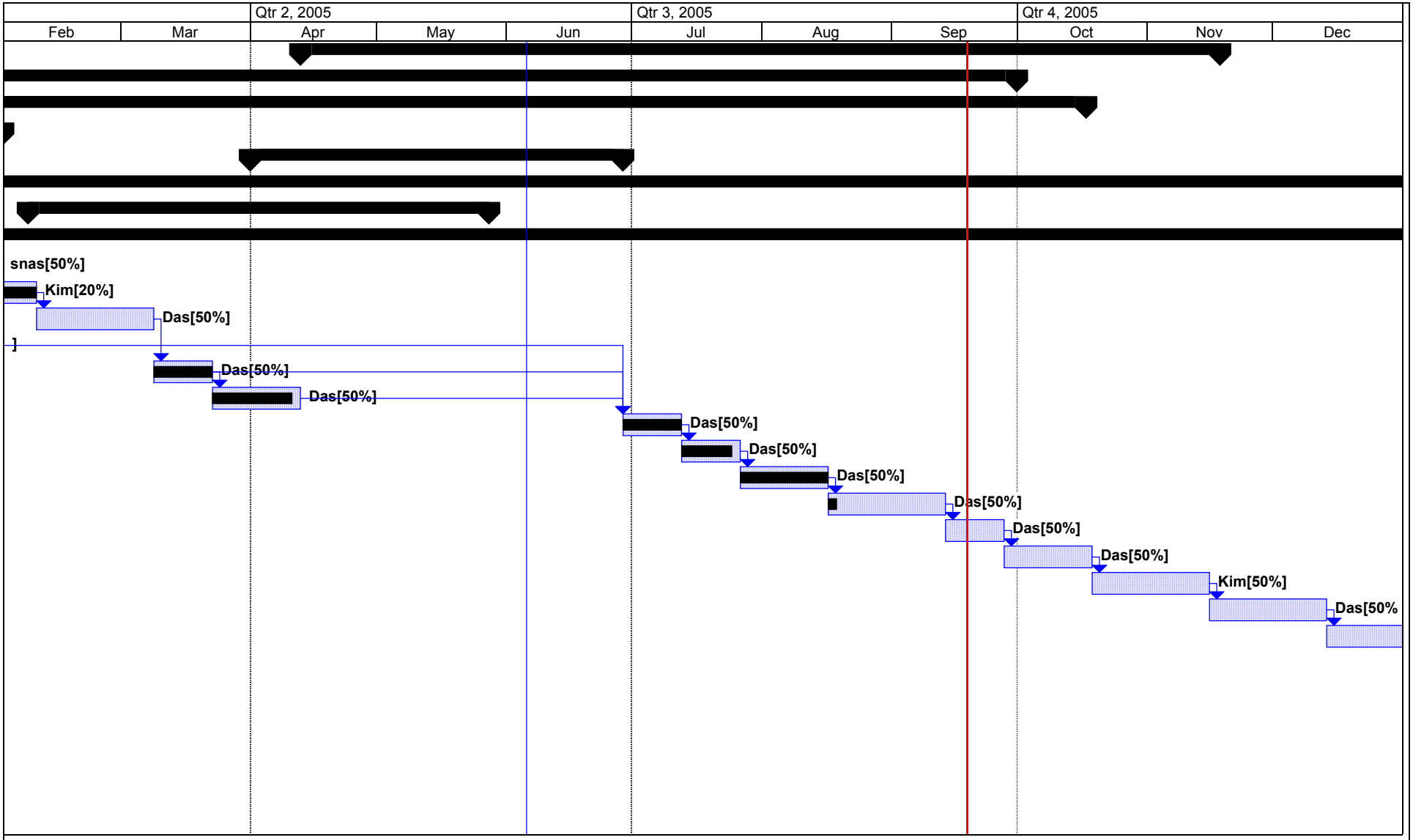

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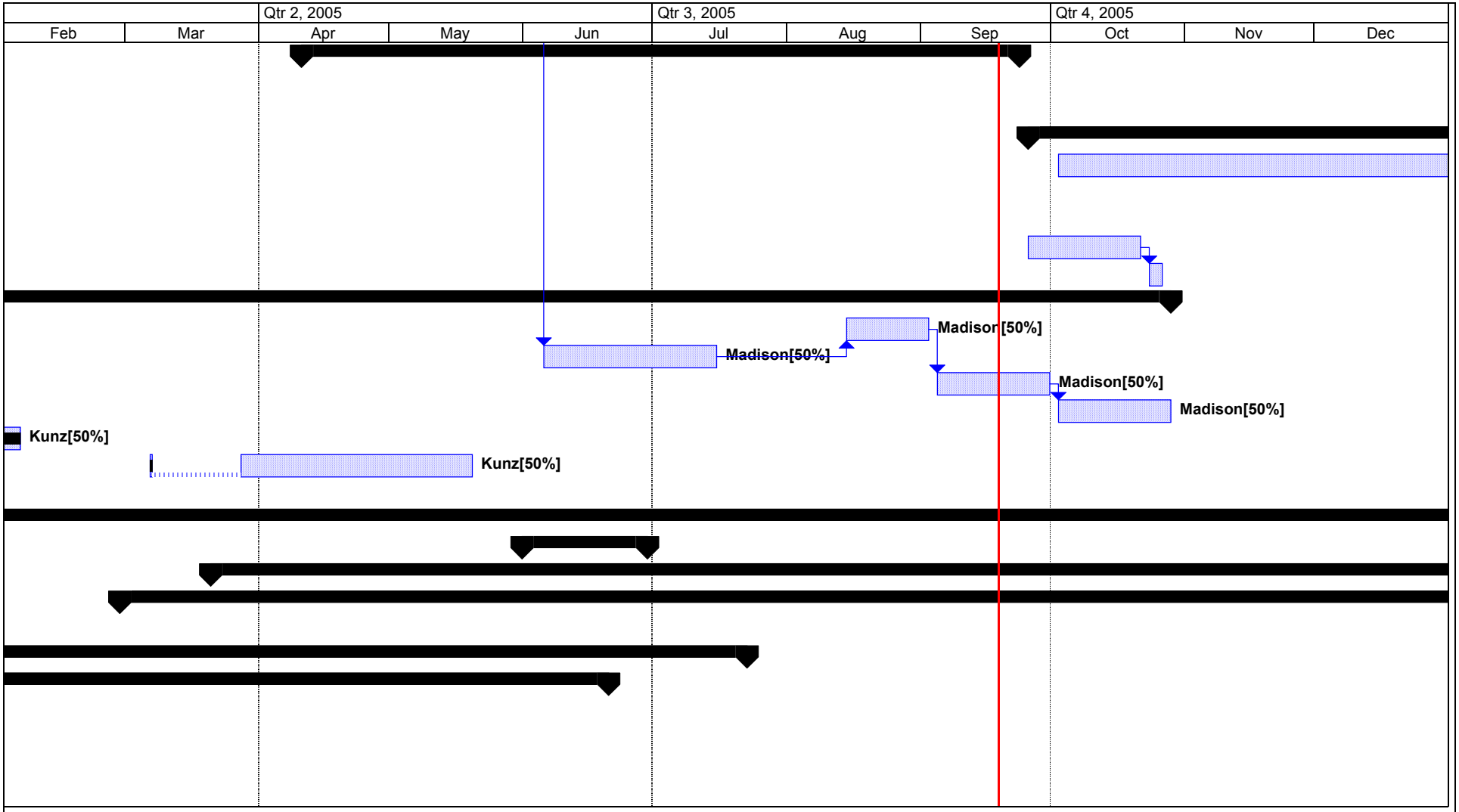

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