

# Rascal Master Schedule

Mar 20, 2014

Saint Louis University

<http://>

Project managers:

Dates:

Mar 6, 2014 - Aug 2, 2014

Complete:

0%

Tasks:

42

People:

9

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This schedule lists all of mission milestones associated with the Rascal mission, which is being co-developed with resources from Saint Louis University and the Boeing Company.

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## Tasks

| Name   | Begin date | End date |
|--|------------|----------|
| <b>Rascal Mission CONOPS</b><br>All tasks related to defining mission requirements, goals, architecture, etc.  | 3/6/14     | 4/1/14   |
| <b>Rascal CONOPS Trade Study</b><br>Trade study comparing missions with and without docking  | 3/6/14     | 3/20/14  |
| <b>Rascal CONOPS Selection</b><br>Final day to decide which CONOPS to pursue   | 3/20/14    | 3/20/14  |
| <b>CONOPS Revision 1</b><br>First revision of CONOPS with docking.   | 3/21/14    | 4/1/14   |
| <b>Rascal Mission Objective and Success Criteria</b><br>Determine success criteria for mission execution, as defined by CONOPS and mission objective.  | 3/21/14    | 4/1/14   |
| <b>Preliminary Rascal RVM</b><br>Requirements Verification Matrix for Boeing delivery  | 3/21/14    | 4/1/14   |
| <b>Primary ADC Subsystem</b><br>Primary ADC Tasks for the Rascal EDU Work  | 3/17/14    | 4/1/14   |
| <b>Preliminary Relative Orbit Analysis</b><br>First principles and trend analysis for relative motion between two spacecraft   | 3/17/14    | 3/21/14  |
| <b>Preliminary Controls Analysis</b><br>Analyzing ideal orbit path for docking mission type, as to determine the effect of sensor noise, perturbations, etc.   | 3/22/14    | 3/25/14  |
| <b>Preliminary Controls Implementation</b><br>Implementing controls analysis into Matlab for testing and simulation  | 3/26/14    | 4/1/14   |
| <b>Preliminary ADC Sensor Research</b><br>Figure out what is necessary/available for determining local spacecraft orientation/inertial position.   | 3/21/14    | 4/1/14   |
| <b>Primary PLD Subsystem</b><br>All tasks associated with the PLD subsystem for work on Rascal EDU   | 3/17/14    | 8/1/14   |
| <b>PRP Subsystem</b><br>All tasks associated with the PRP subsystem for work on Rascal EDU   | 3/21/14    | 4/1/14   |
| <b>Preliminary PRP System Research</b><br>Figuring out the coordinate system terminology that is to be incorporated into the design, picking volume constraints, defining system performance characteristics, etc. | 3/21/14    | 4/1/14   |

## Tasks

| Name   | Begin date | End date |
|--|------------|----------|
| <b>Primary CDH Subsystem</b>   | 3/21/14    | 4/6/14   |
| All tasks associated with the primary CDH subsystem for work on Rascal EDU   |            |          |
| <b>Review Boeing Colony-II Bus User Guide</b>  | 3/21/14    | 3/25/14  |
| Look-over the user's guide provided by Boeing, as to determine the communication protocol being used between SLU and Colony-II, as well as the type of sensor information being passed between each. |            |          |
| <b>Preliminary Spacecraft Functional Block Diagram</b>   | 3/26/14    | 4/6/14   |
| Determine functional block diagram for interface between each portion of SLU and Boeing side of primary spacecraft.  |            |          |
| <b>DCK Subsystem</b>   | 3/21/14    | 4/13/14  |
| All tasks associated with the DCK subsystem for work on Rascal EDU   |            |          |
| <b>Define Separation Requirements</b>  | 3/21/14    | 4/1/14   |
| Important in determining which designs are feasible. Will result from analysis being done by ADC team.   |            |          |
| <b>Preliminary Docking Mechanism Research</b>  | 3/21/14    | 4/1/14   |
| Review docking mechanism heritage and determine whether or not it is necessary to have separate dockin/initial separation mechanisms.  |            |          |
| <b>Assess Primary Spacecraft Docking Integration</b>   | 3/21/14    | 4/1/14   |
| Determine orientation of the Colony-II bus and the feasibility of integrating dockin components into its system.   |            |          |
| <b>Preliminary Methodology Trade Study</b>   | 4/2/14     | 4/13/14  |
| Based on research, determine best method of pursuing docking.  |            |          |
| <b>Secondary STR Subsystem</b>   | 3/21/14    | 4/1/14   |
| All tasks associated with the Secondary STR subsystem for work on Rascal EDU   |            |          |
| <b>Review Previous Skeleton Design Work</b>  | 3/21/14    | 3/25/14  |
| Look over previous skeleton design work (As done by Christopher Berry), and determine what needs to be done going forward with its design.   |            |          |
| <b>Preliminary Mass Budget</b>   | 3/25/14    | 4/1/14   |
| Preliminary mass budget that allocates, as percentage of total spacecraft mass, subsystem mass properties.   |            |          |
| <b>Preliminary Component Listing</b>   | 3/21/14    | 4/1/14   |
| Determine components necessary to integrate all s/c components.  |            |          |
| <b>Secondary COM Subsystem</b>   | 3/21/14    | 4/1/14   |
| All tasks associated with the Secondary COM subsystem for work on Rascal EDU   |            |          |
| <b>Secondary Link Budget Analysis</b>  | 3/21/14    | 3/25/14  |
| Continue assessing link budget, as to determine feasibility of inter-satellite communication.  |            |          |

## Tasks

| Name  | Begin date | End date |
|---|------------|----------|
| <b>Preliminary Component Research</b><br>Research the components necessary to achieve mission goals (inter-satellite communication and ground downlink capabilities).   | 3/21/14    | 4/1/14   |
| <b>Secondary PWR Subsystem</b><br>All tasks associated with the Secondary PWR subsystem for work on Rascal EDU  | 3/21/14    | 4/15/14  |
| <b>Secondary Power Budget</b><br>Based on preliminary power budget work, begin determining max lifetime based on realistic battery and EPS figures, as well as on estimates of power consumption of the rest of the spacecraft.                           | 3/21/14    | 4/1/14   |
| <b>Preliminary Component Selection</b><br>Based on power requirements dictated by the power budget, determine the type and number of batteries necessary to execute the mission, as well as what's necessary to integrate said batteries into the design. | 4/2/14     | 4/15/14  |
| <b>Secondary ADC Subsystem</b><br>All tasks associated with the Secondary STR subsystem for work on Rascal EDU  | 3/21/14    | 4/22/14  |
| <b>Preliminary Detumbling Analysis</b><br>Review work that was done for COPPER and Argus and determine how to implement said analysis for the secondary spacecraft and its tumbling mitigation.   | 3/21/14    | 4/8/14   |
| <b>Preliminary Detumbling Requirements</b>  | 4/9/14     | 4/15/14  |
| <b>Preliminary Detumbling Component Selection</b><br>Based on detumbling requirements, determine components necessary to achieve said requirements.   | 4/9/14     | 4/22/14  |
| <b>Determine GPS Frequency</b><br>Based on accuracy information and necessary data.   | 3/21/14    | 3/25/14  |
| <b>Secondary CDH Subsystem</b><br>All tasks associated with the Secondary CDH subsystem for work on Rascal EDU  | 3/21/14    | 4/13/14  |
| <b>Preliminary Spacecraft Functional Block Diagram</b><br>Determine the subsystems necessary to execute mission goals, as well as the manner in which each subsystem interacts with the other.  | 3/21/14    | 4/1/14   |
| <b>Preliminary Software System Overview</b><br>Analyze previous software development for COPPER and Argus and determine what can be brought in for Rascal work and what needs to be added/taken away.   | 4/2/14     | 4/13/14  |
| <b>Student Graduation</b>   | 5/15/14    | 5/15/14  |
| <b>EDU Delivery</b>   | 8/1/14     | 8/1/14   |

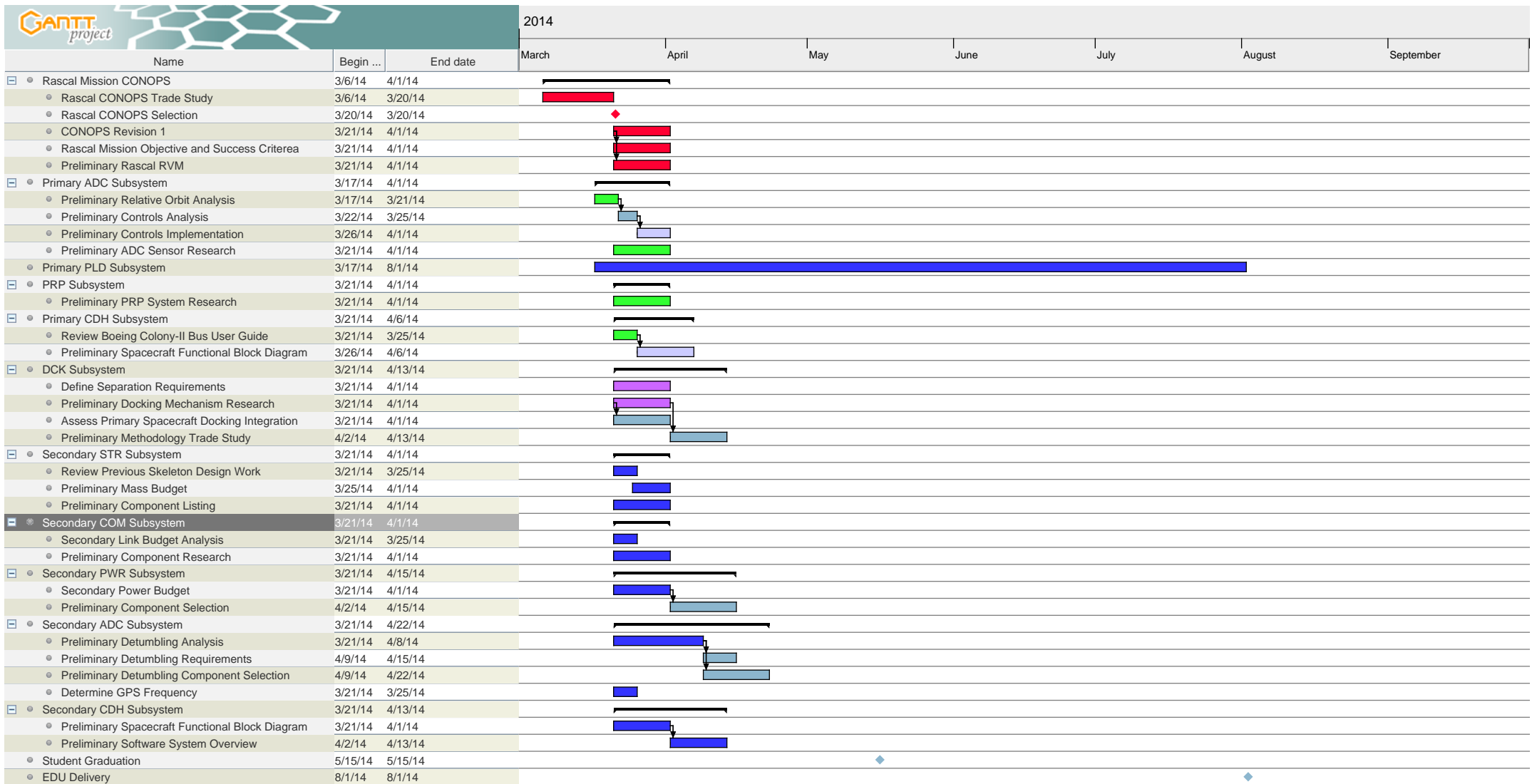
## Resources

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| Name              | Default role                         |
|-------------------|--------------------------------------|
| Tom Moline        | Primary Spacecraft Program Manager   |
| Nate Richard      | Secondary Spacecraft Program Manager |
| Jennifer Babb     | DCK Lead                             |
| Tyler Olson       | PRP Lead                             |
| Kate Clements     | Primary ADC Co-Lead                  |
| Nathan Bossart    | Primary PLD Lead                     |
| Joe Mayer         | undefined                            |
| Christopher Berry | undefined                            |
| Alex Howard       | Secondary PWR Lead                   |

## Gantt Chart

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Resources Chart

