

Table \_\_\_\_\_ ACS Spacecraft Requirements Matrix

Rule Number	Rule Text	Classification	Spacecraft	System
I	Abide by the prevailing Cube Quest Challenge rules as defined in Document No.: CCP-CQ-OPSRUL-001 Cube Quest Challenge Ground Tournaments, Deep Space Derby, and Lunar Derby Operations and Rules December 4, 2014 Revision C, December 30, 2015 and subsequent revisions as made applicable.	Admin & Technical	Yes	All
II	ACS Spacecraft Requirements Abstract from Document No.: CCP-CQ-OPSRUL-001			
	Eligibility and Registration			
	Rule 1: Eligibility to Compete and win prize(s)			
	Rule 1.A: In order to be eligible to win a Prize, the Team Leader must be (i) a citizen or permanent resident of the United States, or (ii) an Entity that is incorporated in and maintains a primary place of business in the United States. Competitor Teams must furnish proof of eligibility (including proof of citizenship or permanent resident status, for Team Leader, and proof of incorporation and primary place of business, for an U.S. Entity) that is satisfactory to NASA in its sole discretion. A Competitor Team's failure to comply with any aspect of the foregoing requirements shall result in the Competitor Team being disqualified from winning a Prize from NASA.	Admin		
	Rule 1.B: A Competitor Team is comprised of one or more Team Members. A Team Member can be an individual or an Entity. If a Team Member is an individual, the individual has to be a citizen or permanent resident of the United States. If the Team Member is an Entity, the Entity must be a U.S. Entity (incorporated in and maintains a primary place of business in the United States). Foreign nationals may own up to 49% of an otherwise eligible U.S. Entity. Foreign nationals may only participate as either owners, employees, or students of an otherwise eligible U.S. entity.	Admin		
	Rule 1.C: No Team Member shall be citizens of a country on the NASA Export Control Program list of designated countries. (The current list of designated countries can be found at <a href="http://oir.hq.nasa.gov/nasaecp/">http://oir.hq.nasa.gov/nasaecp/</a> ).	Admin		
	Rule 1.D: A Federal Entity or Federal Employee may not participate in the Cube Quest Challenge if acting within the scope of their employment.	Admin		
	Rule 1.E: An Entity Employee, or Entity, contracted by the US. Government and physically located at a Federally Owned Facility may not participate if acting within the scope of the contract.	Admin		
	Rule 1.F: Each Team Member shall acknowledge by their signature in the Registration Data Package that NASA shall make Prize payments to the Team Leader, also indicated in the Registration Data Package. Any failure of the indicated Team Leader to make payments of any kind to Team Members is the responsibility of the Team Leader and not the responsibility of NASA.	Admin		
	Rule 1.G: A Competitor Team may only submit a single CubeSat into competition to win a Cube Quest Challenge Prize; however, a Team Member may support more than one Competitor Team.	Admin		
	Rule 2: Competitor Team Responsibilities and Agreements			
	Rule 2.A: Competitor Teams are responsible for compliance with all applicable regulations and laws including obtaining any necessary approvals for foreign student or employee participation.	Admin		
	Rule 2.B: Prospective Competitor Teams shall submit their notice of intention to compete, and a Registration Data Package (defined in Section 5.0), to the Email address given in Section 5.2. In addition, Competitor Teams must submit a Mission Concept Registration Data Package, as defined in Rule 3, within 60 calendar days after their registration. The prospective Competitor Team will receive a formal acknowledgement receipt of their package within 5 business days of submittal and a formal acceptance as Challenge Competitor Teams within 15 business days.	Admin		

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	<p>Rule 2.C: Liability insurance - All Team members agree to assume any and all risks and waive claims against the Federal Government and its related Entities, except in the case of willful misconduct, for any injury, death, damage, or loss of property, revenue, or profits, whether direct, indirect, or consequential, arising from their participation in the competition, whether such injury, death, damage, or loss arises through negligence or otherwise. For the purposes of this paragraph, the term 'related Entity' means a contractor or subcontractor at any tier, and a supplier, user, customer, cooperating party, grantee, investigator, or detailee. Team Members must obtain liability insurance or demonstrate financial responsibility, in the amount of \$1,000,000 for claims by- A. A third party for death, bodily injury, or property damage, or loss resulting from an activity carried out in connection with participation in a competition, with the Federal Government named as an additional insured under the registered participant's insurance policy and registered participants agreeing to indemnify the Federal Government against third party claims for damages arising from or related to competition activities; and B. The Federal Government for damage or loss to Government property resulting from such an activity.</p>	Admin		
	<p>Rule 2.D: Use of NASA Name and Insignia Competitor Teams may not use the name or insignia of NASA on its hardware and printed materials related to the participation of Competitor Teams in the Challenge without NASA's prior written consent. Competitor Teams agree that unauthorized use of such names, trademarks, and insignias shall result in elimination from Challenge participation if Competitor Teams continue unauthorized use after being notified to cease and desist by NASA.</p>	Admin		
	<p>Rule 2.E: Compliance with Existing Laws - Competitors will comply with all U.S. laws, regulations and policies, including those relating to export control and nonproliferation, and the laws of relevant state and local jurisdictions that NASA Centennial Challenges pertain to or govern any activities conducted by Competitors in connection with the Challenge.</p>	Admin		
	<p>Rule 2.F: Reporting - On a monthly basis, Competitor Teams agree to provide NASA with a written total (a single amount) of the following: Competitor Team's incremental and cumulative financial, property (capital), personnel, and any other investments, and/or expenditures (direct or in-kind) made to conduct any and all activities related to or required by participation of the Competitor Team in the Challenge. NASA will not make this information public except in aggregate form for all Competitor Teams competing in the Challenge.</p>	Admin		
	<p>Rule 2.G: Media Rights The Competitor Team retains all Media Rights related to the story of its participation in the Challenge. The Competitor Team agrees that NASA will retain all Media Rights related to the story of the Challenge. Each Team Member agrees to let NASA use the name and likeness of such Team Member (without charge) as may be reasonably required in connection with the media material prepared and distributed by NASA relating in any way to the Challenge. The Competitor Team agrees to provide NASA reasonable amounts of video footage or access for recording activities related to participation of Competitor Team in the Challenge and the right to use said footage for public affairs and/or educational purposes. The Competitor Team agrees that its failure to furnish video footage or access for recording purposes based on NASA's reasonable requests may result in the Competitor Team's removal from participation in the Challenge.</p>	Admin		
	<p>Rule 2.H: Purchase and Sales Rights The Competitor Team agrees that NASA retains the non-exclusive right to purchase from Competitor Team the resultant or derived product, service, or technology used to win the Challenge. This section does not guarantee a purchase of the resultant or derived product, service, or technology and is subject at all times to the parties reaching mutual agreement after the Challenge. The Competitor Team retains all rights to sell the resultant or derived product, service, or technology used to win the Challenge to whomever they wish, provided they abide by all local, state, and federal laws and regulations regarding the sale and export of technology.</p>	Admin		

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	Rule 2.I: Intellectual Property Rights Notwithstanding anything to the contrary in these rules, NASA claims no intellectual property (IP) rights from the Competitor Team. All trade secrets, copyrights, patent rights, and software rights will remain with each respective Competitor Team. To the extent the Competitor Team owns IP resulting from its participation in Challenge, the Competitor Team agrees to negotiate in good faith with NASA for a grant of a nonexclusive, nontransferable, irrevocable, license to practice or have practiced for or on behalf of the United States, the intellectual property throughout the world, at reasonable compensation, if NASA chooses to pursue such a license.	Admin		
	Rule 2.J: Delay, Cancellation or Termination The Competitor Team acknowledges that circumstances may arise that require the Challenge to be delayed indefinitely or cancelled. Such delay or cancellation, and/or the termination of the challenge, shall be within the full discretion of NASA, and the Competitor Team accepts any risk of damage or loss due to such delay, cancellation, and/or termination.	Admin		
	Rule 3: Competitor Teams shall submit to NASA a Mission Concept Registration Data Package within 60 calendar days after their registration (and 30 calendar days before they may participate in any of the GTs). The Mission Concept Registration Data Package is defined in a separate document (available on the Cube Quest Challenge website). It includes at least the following content: <ul style="list-style-type: none"> <li>• Statement of Intent to Compete</li> <li>• Concept of Operations</li> <li>• Conceptual Mission Design</li> <li>• Conceptual method for CubeSat disposal</li> <li>• Satellite Communications Concept</li> </ul>	Admin		
	4.2 EM-1 Launch and Schedule The Ground Tournaments schedule and the EM-1 payload delivery, payload integration, and launch schedules shall be according to a separately published Cube Quest Challenge schedule (CCP-CQ-SCHED-001). Schedule will be published on the Cube Quest Challenge website. If any reason arises such that payload integration, launch, and deployment on the EM-1 mission cannot take place as planned for the Cube Quest Challenge, NASA will investigate launch alternatives. If no reasonable alternatives are found to be available, NASA reserves the right to postpone, modify, or cancel the in-space portion of the Challenge.	Admin		
	4.2.1 Notification to Competitors of EM-1 Deployment Trajectory NASA provides updates on the Centennial Challenge Program Cube Quest Challenge website of the planned orbital elements of the Space Launch System (SLS) upper stage after its disposal maneuver. The final orbital elements of the EM-1 Secondary Payloads will be posted within 24 hours after the actual EM-1 Secondary Payload deployment maneuver. Competitor Teams deployed from EM-1 SLS upper stage will be notified of confirmation of successful deployment of their CubeSat as soon as possible after the event. This time constitutes the "Start of Competition" as defined in Rule 15.	N/A		
	4.3 Design Requirements			
	Rule 4: CubeSat Mass, Volume, and Interface Requirements			
	Rule 4.A: To be eligible for NASA EM-1 Launch, the Competitor's CubeSat shall meet all the requirements of the SLS Secondary Payload Deployment System Interface Definition Requirements Document (IDRD). In the event of a conflict between the SLS IDRD and these Competition Rules, the SLS IDRD shall take precedence. The IDRD will be available to Competitor Teams no later than GT-2.	Admin		
	Rule 4.B: For both EM-1 and non-EM-1 launches, payloads shall meet 6U size and mass requirements as defined in the latest version of the SLS Secondary Payload IDRD.	Technical	Yes	All
	Rule 4.C: A Competitor Team may submit and operate only one single payload, compliant with the 6U volume and mass constraint as specified in the SLS Secondary Payload IDRD, eligible for Prizes.	Technical	Yes	All

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	Rule 4.D: Competitor Teams with non EM-1 launches shall be responsible for determining, and complying with, their own respective responsibilities and requirements with the third-party launch vehicle provider. NASA will not assist with compliance with third party launch provider requirements.	Technical & Admin	Yes	All
	Rule 4.E: In case of any discrepancy between the volume and mass allowances of NonEM-1 launch providers and those of the NASA EM-1 launch, the allowances of the SLS Secondary Payload User's Guide and IDRD shall take precedence for Challenges eligibility.	Technical	Yes	All
	Rule 4.F: Competitor Teams with non-EM-1 launches shall submit a Required Data for Competitor Teams with Non-NASA Launch package (defined in a separate document) at least 2 weeks prior to payload integration, and shall allow a Challenge-designated government inspector to verify by inspection, test, or other method of verification, the data it contains.	Technical	Yes	All
	Rule 5: Radio Frequency Authorization			
	Rule 5.A: Competitors agree that use of Radio Frequencies (RF) for any purpose, such as spacecraft tracking and control, information (data) transmission to and from the spacecraft, or active sensors, will be in accordance with all U.S. laws and regulations, and with the International Radio Regulations promulgated by the International Telecommunication Union (ITU). The controlling organization for each CubeSat shall obtain Federal Communications Commission (FCC) radio frequency authorization in accordance with the Rules and Regulations, Title 47, of the Code of Federal Regulations. FCC Public Notice DA: 13-445 ( <a href="http://www.fcc.gov/document/guidance-obtaining-licenses-small-satellites">http://www.fcc.gov/document/guidance-obtaining-licenses-small-satellites</a> ) is useful in deciding authorization options to consider.	Technical		COMM
	Rule 5.B: For all communications, including communications eligible for these Challenges, any electromagnetic spectrum frequency (e.g., RF, infrared, visible light, etc.) is allowed, subject to all applicable RF licensing and spectrum allocation Rules.	Technical		COMM
	Rule 5.C: Competitors are responsible for obtaining necessary RF operating licenses for both their CubeSat space stations and for all ground stations under their control, and are responsible for abiding by National and International Rules governing radio operators in their operating spectrum.	Technical		COMM
	4.4 Monitoring and Inspections			
	Rule 6: Competitors shall permit NASA to non-invasively monitor any space-based communication relevant to the Challenges, using NASA's resources without prior notification to the Competitors. This monitoring may be used to verify compliance with the Challenge Rules and may be used to validate Competitor Team's submissions. This monitoring will not be used as a Competitor Team's official entry into competition. Competitor Teams may not use data encryption (other than encryption authorized by NASA) for transmission of commands or data relevant to the Challenges.	Admin		
	Rule 7: Competitors shall permit NASA visits to Competitor's operations sites, and permit inspection of cubesats, dispensers, ground equipment and operating procedures. Visits may be used to verify compliance with the Challenge Rules.	Admin		
	4.5 Rules for Ground Tournament As specified in the Rules below, GT scores are based on judges assessment of each Competitor Team's compliance to specific Challenge Rules and SLS Interface Requirements, and assessment of mission success probability for meeting the minimum requirements for either (or both) the In-space Prizes (depending on which In-space Prize(s) the Competitor Team indicates they intend to enter).	Admin		

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	4.5.1 Ground Tournament Constraints Any Competitor Team may participate in any or all of the Ground Tournaments (GTs). To participate in any GT, it is not necessary to have competed in the previous GTs. For example, a Competitor Team is not required to have participated in GT-1, 2, or 3 in order to participate in GT-4. However, the Competitor Team must submit their Mission Concept Registration Data Package (defined in Rule 3) at least 30 calendar days prior to their first GT in which they participate or by the published date. Judging criteria and expected degrees of design maturity advance progressively for each successive GT, and all Competitor Teams (whether they are pursuing an EM-1 spot or a third party launch) are judged by the same technical criteria at each GT.	Admin		
	Rule 8: Constraints on Ground Tournament Participation			
	Rule 8.A: Registered Competitor Teams may participate in any, or all, of the Ground Tournaments (GT). Competitor Teams that arrange for independent, thirdparty launches may, but are not required to, participate in any GT.	Admin		
	Rule 8.B: Competitor Teams shall submit a Mission Concept Registration Data Package (defined in Rule 3) at least 30 calendar days prior to participating in their first GT.	Admin		
	Rule 8.C: Before each GT, Competitor Teams shall declare whether they intend to compete in either the Deep Space Derby or the Lunar Derby or both. Competitors may change their declaration prior to each GT. These declarations may be made publicly available on the Challenge website.	Admin		
	Rule 8.D: Prior to each GT, Competitor Teams shall declare their intention to compete for integration and launch on EM-1, or their intention to arrange for their own independent, third-party launch. Competitors may change their declaration until GT-2 at which point they must make a final declaration. These declarations may be made publicly available on the Challenge website.	Admin		
	Rule 8.E: Competitors shall participate in at least GT-2 to be considered for selection as a secondary payload on the EM-1 launch.	Admin		
	Rule 8.F: The SLS Program requires a series of four Payload Safety Reviews (Phase 0 - Phase 3 Safety Reviews) before any CubeSat is accepted for integration to launch on EM-1. Only the top 5 winners of GT-1 and GT-2 will be submitted to Phase 0 and Phase 1 Safety Reviews, respectively. Only those Competitor Teams that pass the Phase 0 or the Phase 1 Safety Review may proceed to the Phase 2 Safety Review. Only those Competitor Teams that pass the Phase 2 Safety Review and are a top 5 winner in GT-4 may proceed to the Phase 3 Safety Review. The effect of these constraints is that only the top 5 winners of GT-1 or GT-2, who proceed to be top 5 winners of GT-4, will be eligible to launch on EM-1.	Admin		
	4.5.2 Procedures and Judging for Ground Tournament Ground Tournaments (GTs) require Competitor Teams to deliver submittal materials specified in the Ground Tournament Workbook, and to deliver interactive presentations to judges, either by video conference or in person at locations to be specified for each GT. Judges will consult with a NASA design center and/or third-party experts, and run mission simulations and analysis using product specifications and performance projections submitted by each Competitor Team 30 calendar days prior to GT. Judges will provide scores to Competitor Teams using standardized criteria, based on a scale of 1 (low, poor) to 5 (high, superb). A score of zero will be given for elements in which insufficient or no data was submitted. Judges will provide scores to Competitor Teams within two weeks of their GT.	Admin		
	Rule 9: Ground Tournament Judging			
	Rule 9.A: For each GT, Competitors shall submit required documents and data as listed on the Judges Score Card on dates specified in the published GT schedules. GT judging templates will be provided in advance to the Competitor Teams.	Admin		

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	Rule 9.B: Competitors shall permit Judges, or designee, (upon request) to conduct site inspections, inspections of competition hardware and/or software, and allow component or subsystem tests witnessing in order to verify submitted documentation.	Admin		
	Rule 9.C: Competitor Teams shall allow their composite scores to be posted on the Challenge website after each GT. (Competitor Team technical Intellectual Property will not be publicly released.)	Admin		
	Rule 9.D: All Competitor Teams shall be judged by the same criteria at each GT for probability of mission success, and for compliance with specific Challenge Rules.	Admin		
	Rule 9.E: For each GT, 40% of each Competitor Team's assigned total score will be determined by the probability of mission success using the Judge's Scorecard.	Admin		
	Rule 9.F: For each GT, 60% of each Competitor Team's assigned total score will be determined by compliance to specific Challenge Rules and (a) for Teams that state their intention to launch on EM-1 SLS: compliance with SLS Interface Requirements as defined in the SLS Secondary Payload Deployment System IDRD; or (b) for Teams that state their intention to launch on a vehicle other than SLS: compliance with the written interface and safety requirements of the team-procured launch service provider.	Technical & Admin	Yes	All
	Rule 9.G: Competitor Teams that arrange for their own third party launches must submit information required in Required Data for Competitor Teams with Non-NASA Launch, and will be judged for compliance with interface and safety requirements of their own launch operators, instead of for compliance with SLS Interface Requirements.	Technical	Yes	All
	4.5.2.1 Rules and Requirements for GT-1 Competition Judges will provide Competitor Team scores based on standardized assessments. Every Competitor Team (up to maximum of 5 Competitor Teams) whose composite score is greater than 3.0 will be awarded \$20,000 each; however if more than 5 Competitor Teams score greater than 3.0 (composite score), only the 5 highest scoring Competitor Teams will be awarded \$20,000 each. Only the GT-1 winners will submit their CubeSat designs for the SLS Phase 0 Payload Safety Review. Only Competitor Teams that pass SLS Phase 0/1 Payload Safety Reviews are eligible for future Safety Reviews and eligible to integrate and launch on EM-1.	Admin		
	Rule 10: To participate in the GT-1 and be eligible for GT-1 Prize Awards, Competitor Teams shall provide to NASA the input listed on the Judges Score Card.	Technical	Yes	All
	4.5.2.2 Rules and Requirements for GT-2 Competition Judges will provide Competitor Team scores based on standardized assessments. Every Competitor Team (up to maximum of 5 Competitor Teams) whose composite score is greater than 3.0 will be awarded \$30,000 each; however if more than 5 Competitor Teams score greater than 3.0 (composite score), only the 5 highest scoring Competitor Teams will be awarded \$30,000 each. Only the GT-2 winners will submit their CubeSat designs to SLS Phase 0/1 Payload Safety Review. GT-1 winners that successfully completed the Phase 0 payload safety review but not selected in GT-2 will submit for Phase 1 payload safety review. Only Competitor Teams that NASA Centennial Challenges pass SLS Phase 0 and 1 Payload Safety Reviews are eligible for future Safety Reviews and eligible to integrate and launch on EM-1.	Admin		
	Rule 11: To participate in the GT-2 and be eligible for GT-2 Prize Awards, Competitor Teams shall provide to NASA the input listed on the Judges Score Card.	Admin		
	Rule 11.A: Prior to GT-2, Competitor Teams must declare their final intention to compete for selection to launch on EM-1 4.5.2.3 Rules and Requirements for GT-3 Competition Judges will provide Competitor Team scores based on standardized assessments. Every Competitor Team (up to maximum of 5 Competitor Teams) whose composite score is greater than 3.0 will be awarded \$30,000 each; however if more than 5 Competitor Teams score greater than 3.0 (composite score), only the 5 highest scoring Competitor Teams will be awarded \$30,000 each	Admin		

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	Rule 12: To participate in the GT-3 and be eligible for GT-3 Prize Awards, Competitor Teams shall provide to NASA the input listed on the Judges Score Card. 4.5.2.4 Rules and Requirements for GT-4 Competition The GT-4 is the final ground competition. Participation in GT-4 is required for all Competitor Teams who qualified in GT-1 or GT-2, passed all required safety reviews, and are requesting integration and launch on EM-1. Judges will provide Competitor Team scores based on standardized assessments. Every Competitor Team (up to maximum of 5 Competitor Teams) whose composite score is greater than 3.0 will be awarded \$20,000 each; however if more than 5 Competitor Teams score greater than 3.0 (composite score), only the 5 highest scoring Competitor Teams will be awarded \$20,000 each.	Admin		
	Rule 13: GT-4 Rules and Requirements			
	Rule 13.A: Prior to GT-4, Competitor Teams must also declare their final intention to compete in the Deep Space Derby, or the Lunar Derby, or both.	Admin		
	Rule 13.B: To participate in the GT-4 and be eligible for GT-4 Prize Awards, Competitor Teams shall provide to NASA the input listed on the Judges Score Card	Technical	Yes	All
	Rule 13.C: Only the top 5 highest scoring Competitor Teams that achieve all the following: <ul style="list-style-type: none"> <li>• receive a GT-4 score of at least 3 and are in compliance with all Challenge requirements and Space Launch System Secondary Payload Deployment System Interface Definition and Requirements Document (IDRD) requirements, and</li> <li>• declared before GT-2, their intention to launch on EM-1, and</li> <li>• passed SLS Phase 2 Safety Review will be submitted to SLS Phase 3 Safety Review to become qualified for integration, launch, and deployment on EM-1.</li> </ul>	N/A		
	4.5.3 Down Select Launch Candidates (conditional) Rule 14: In the event that the total number of qualified CubeSats exceeds the number of SLS dispenser slots assigned to Cube Quest Challenge, then the following down-select Rules shall apply:	N/A		
	Rule 14.A: Judges shall rank all Competitor Teams in order based on the GT-4 total score. In case of a tie, the tie breaker will be the highest cumulative score across all GTs.	Admin		
	Rule 14.B: At the present time, there are three slots on EM-1 allocated to CubeQuest Challenge. The top 3 teams that successfully pass Phase 3 SRB will be integrated on EM-1.	N/A		
	Rule 14.C: Teams 4 and 5, if they successfully pass the Phase 3 SRB, will be used to backfill in the event that any EM-1 selected competitor team cannot deliver their Cubesat for vehicle integration. "Runner's up" should be prepared (at a moment's notice) to replace any selected Competitor Team up until actual vehicle integration date.	N/A		
	Rule 14.D: Deleted			
	4.6 General Rules Applicable to Both In-Space			
	Rule 15: In-Space Competition Start ("Start of Competition")			
	Rule 15.A: Competitors that have arranged their own third party launches shall notify Judges within one day of their deployment confirmation receipt. The positive deployment confirmation time shall be considered the start time of the first competition day of their respective "Start of Competition".	Technical & Admin		

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	Rule 15.B: For Competitors with CubeSats deployed from EM-1, the positive deployment confirmation time shall be considered the start of the first competition day for all Competitor Teams with CubeSats deployed from EM- 1. (Note that the SLS Payload User's Guide and/or the SLS Secondary Payload Deployment System Interface Definition and Requirements Document may specify a timed delay before CubeSats may begin powered operation after the deployment from the SLS. Nevertheless, the deployment confirmation time shall be considered the "Start of Competition" for CubeSats deployed from EM-1.) In support, NASA will notify Competitors within one day of their successful deployment from EM-1 SLS.	N/A		
	Rule 16: Competitor Ground Stations			
	Rule 16.A: Competitor Teams may communicate with, and update, their CubeSat as often as desired within the competition period. This includes commands, revised operating instructions, software updates, etc.	Technical		Ground Systems COMM
	Rule 16.B: Earth-based transmissions and receptions may be performed from the same ground station or differing ground stations.	Technical		Ground Systems COMM
	Rule 16.C: Competitor Teams may not use Government controlled stations as their primary data communications stations for the purposes of communications NASA Centennial Challenges achievements eligible for in-space Prizes, unless appropriate compensation is provided and the station is also made available under the same terms to all Competitors.	Technical & Admin		Ground Systems COMM
	Rule 16.D: Competitor Teams will not be charged for communications monitoring by Government-controlled stations strictly for the purpose of authenticating claimed communications distances, or for verifying the achievement and maintenance of lunar orbit. See Required Navigation Artifacts for Authenticating Claimed Comm Distances and Verifying Achievement and Maintenance of Lunar Orbit.	Technical & Admin		Ground Systems COMM
	Rule 16.E: Ground station operators may be Team Members (Rules 1 and 2 apply), or ground station services or facilities may be procured by the Competitor Team (Rules 1 and 2 do not apply, except for Rule 1.C).	Technical & Admin		Ground Systems COMM
	Rule 17: Planetary Protection			
	Rule 17.A: Competitor Teams shall submit Orbital Debris Assessment Reports (ODARs) and End of Mission Plans (EOMPs) that are compliant with NASA-STD- 8719.14 Process for Eliminating Orbital Debris, in order to be compliant with U.S. National Space Policy of the United States of America (June 2010), the U.S. Government Orbital Debris Mitigation Standard Practices (February 2001), and other National and International policies and guidelines for limiting Earth-orbiting debris.	Technical & Admin	Yes	All
	Rule 17.B: Competitor Teams shall submit their ODARs and EOMPs to Judges no later than Ground Tournament 4.	Technical & Admin	Yes	All
	Rule 17.C: Competitor Teams with CubeSats that enter lunar orbit shall submit an End of Mission Plan that, to the satisfaction of Judges, complies with "NASA's Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts" found at <a href="http://www.nasa.gov/sites/default/files/617743main_NASAUSG_LUNAR_HISTORIC_SITES_RevA-508.pdf">http://www.nasa.gov/sites/default/files/617743main_NASAUSG_LUNAR_HISTORIC_SITES_RevA-508.pdf</a>	Technical & Admin	Yes	All
	Rule 17.D: Competitor Team mission designs must be compliant with requirements of NPR 8020.12 Planetary Protection Provisions for Robotic Extraterrestrial Missions. For Competitor Teams that demonstrate to the satisfaction of Judges (by trajectory simulation/analysis or other documentation) that their CubeSats will not encounter any protected planet (beyond Earth and Earth's moon), then written documentation compliant with NPR 8020.12 is the only requirement for planetary protection. (Tests and demonstrations would not be required.)	Technical & Admin	Yes	All



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	Rule 17.E: Competitor Teams shall submit a letter to Judges explaining their planetary protection plan at GT-1. Competitor Teams shall submit their final planetary protection plan at GT-4. Competitor Teams shall submit a Pre-launch report for purposes of compliance with NPR 8020.12 at L-60 calendar days. Competitor Teams shall submit a post-launch report at L+60 calendar days. Competitor Teams shall submit an EOMP at mission end.	Admin		
	Rule 18: Communications Competition Procedure for Both In-Space Challenges. The exact details of the implementation of the following Rules are contained in the supplemental document Communications Procedure for Both In-Space Challenges (CommsProc).	Technical & Admin		DMS COMM
	Rule 18.A: Each Competitor Team shall inform Judges a minimum of 24 hours prior to the start of each operating period (as specified in CommsProc). If the Competitor Team does not announce operating periods, then Judges will not consider any operations that day for competition purposes.	Technical & Admin		Ground Systems & Payload Systems
	Rule 18.B: Competitor Teams shall generate their random data using the algorithms and protocols specified in CommsProc. Judges will not accept data generated by any other methodology.	Technical		DMS
	Rule 18.C: The Competitor Team shall supply a CubeSat communications log to the Judges to verify competition timing.	Technical		DMS COMM
	Rule 18.D: Competitor Teams may choose to wrap data blocks in a convenient protocol for transmission to assist with block accounting and sequencing as long as the Judges can verify that data were generated by the prescribed algorithm.	Technical		DMS COMM
	Rule 18.E: The Competitor Team shall receive the data blocks over the communications link, perform any required error correction deemed necessary, and arrange the blocks in correct sequence. Any blocks that are not completely received within the operating period will not count towards the operating period total.	Technical		
	Rule 18.F: The Competitor Team shall deliver to NASA properly sequenced, unique (nonduplicative) error-free data blocks received at the ground station(s) within 10 minutes of the operating period closure. If the Competitor Team requires a data retransmission to achieve an error-free block, the Competitor Team must complete that transaction by the end of the operating period.	Technical		
	Rule 18.G: As specified in CommsProc, the Competitor Team shall provide the evidence that authenticates actual transmission achievement from their spacecraft in space and ground station receipt to the Judges. The Competitor Team shall make raw data available to the Judges at the same time as the Competitor Team presents the sequenced data. Judges shall also receive contact logs from the ground station operators. Logs are to include (at minimum) pointing data, AZ/EL coordinates, and receiver start/stop times. Competitor Teams shall provide documented	Technical		
	Rule 19.G compliance procedures before GT-3.			
	Rule 19: Competition End for Both In-Space Challenges ("End of Competition")			
	Rule 19.A: For Competitor Teams that have arranged their own third party launch, all activities for the purposes of these Challenges shall end exactly 365 competition days after their respective CubeSat deployment confirmation time, or exactly 365 competition days after the EM-1 deployment confirmation time, whichever occurs first.	Technical	Yes	All
	Rule 19.B: For Competitor Teams deployed on EM-1, all activities for the purposes of these Challenges end exactly 365 competition days after the EM-1 deployment confirmation time.	N/A		
	Rule 19.C: No activity taking place later than exactly 365 competition days after the EM-1 CubeSat deployment shall be counted for Challenge purposes, regardless of the respective launch dates.	Admin		

Table \_\_\_\_\_ ACS Spacecraft Requirements Matrix

	Rule 19.D: For Competitor Teams that have arranged their own third party launch, data transmissions after 365 calendar days will only be used for longevity category entrants regardless of data burst rate or data aggregate volume. Data transmissions must meet minimum requirements based on the prize.	Technical		COMM
	Rule 20: If, for any reason, a CubeSat does not successfully deploy from EM-1 (a dispenser malfunction, for example), then that Competitor Team shall be ineligible for any In-space Prizes.	N/A		
	Rule 21: Competitor Teams shall acknowledge that NASA reserves the right to share information about Competitor Team accomplishments and progress, after verification by Judges, throughout the Challenge period. Accomplishment or progress information may include, for example, the data volumes communicated, time of lunar orbit, and cubesat distances from Earth. NASA also reserves the right to publicly announce when Competitor Teams are planning to attempt a communications task or propulsion maneuver before results have been confirmed by Judges.	Admin		GN&C COMM Ground Systems
	4.7 Additional Rules for Deep Space Derby			
	Rule 22: Achievement and Maintenance of Verifiable Minimum Required Distance from Earth			
	Rule 22.A: Competitor CubeSats shall achieve and maintain a verifiable minimum required distance from Earth's surface of at least 4,000,000 kilometers (+/- 4,000 km allowable tolerance) during any operations that would count toward the Deep Space Derby Prizes achievements.	Technical	es	GN&C COMM Ground Systems
	Rule 22.B: Competitors shall provide evidence that demonstrates, to the Judges' satisfaction, the spacecraft distance from Earth. (Acceptable evidence to be submitted to NASA for purposes of authenticating the claimed distance from Earth is specified in Required Navigation Artifacts for Authenticating Claimed Comm Distances and Verifying Achievement and Maintenance of Lunar Orbit, a separate document.)	Technical		GN&C COMM Ground Systems
	Rule 22.C: In the event that no CubeSat successfully reaches the minimum distance from Earth (Rule 22.A) within 365 competition days of the EM-1 launch, NASA will declare the Deep Space Derby over with no winner and no prizes awarded.	Technical & Admin	Yes	All
	Rule 23: Deep Space Derby Prizes			
	Rule 23.A: Best Burst Data Rate: \$225,000 will be awarded to the Competitor Team that receives the largest, and \$25,000 will be awarded to the Competitor Team that receives the second largest, cumulative volume of error-free data (above the minimum volume of one 1024 bit data block) from their CubeSat over a 30-minute period while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum volume, they are awarded \$250,000. If no Competitor Team achieves more than the minimum volume, no Best Burst Data Rate prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	Rule 23.B: Largest Aggregate Data Volume Sustained Over Time: \$675,000 will be awarded to the Competitor Team that receives the largest, \$75,000 will be awarded to the Competitor Team that receives the second largest, cumulative volume of error free data (above the minimum volume of one thousand 1024 bit data blocks) from their CubeSat over their best contiguous 28-day (calendar days) period while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum volume, they are awarded \$750,000. If no Competitor Team achieves more than the minimum volume, no Largest Aggregate Data Volume prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All

Table \_\_\_\_\_ ACS Spacecraft Requirements Matrix

	Rule 23.C: Spacecraft Longevity: \$225,000 will be awarded to the Competitor Team with the longest elapsed number of competition days, and \$25,000 will be awarded to the Competitor Team with the second longest elapsed number of competition days, between the date of their first and last, confirmed reception of error-free, 1024-bit data blocks from their CubeSat while maintaining at least the minimum required distance from Earth, and before the "End of Competition" (above the minimum number of 28 elapsed competition days) while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum number of 28 elapsed competition days, they are awarded \$250,000. If no Competitor Team achieves more than the minimum number of 28 competition days, no Longevity Contest prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	Rule 23.D: Farthest Communication Distance From Earth: \$225,000 will be awarded to the Competitor Team that receives from the CubeSat at least one, error-free, 1024-bit data block, from the greatest, and \$25,000 will be awarded to the Competitor Team with the second greatest distance from Earth (above the minimum distance of 4,000,000 km), and before the "End of Competition", while satisfying Challenge Rules and definitions. If only one Competitor Team receives at least one, error-free 1024-bit data block (above the minimum distance of 4,000,000 km from Earth), they are awarded \$250,000. If no Competitor Team receives data, no Farthest Communication Distance prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	4.8 Additional Rules for Lunar Derby			
	Rule 24: Achievement and Maintenance of Verifiable Lunar Orbit			
	Rule 24.A: Competitor CubeSats shall achieve and maintain a verifiable lunar orbit, during any operation that would count towards the Lunar Derby Prizes achievements.	Technical		GN&C
	Rule 24.B: For the purpose of the Lunar Derby, a lunar orbit is defined as at least one complete orbit of minimum distance always above the lunar surface of 300 km, and with an aposelene that never exceeds 10,000 km.	Technical		GN&C
	Rule 24.C: Competitors shall provide evidence, to the Judge's satisfaction, that demonstrates that they have successfully achieved a lunar orbit, as defined in Rule 24.B. (Acceptable evidence to be submitted to NASA for purposes of authenticating claimed lunar orbit is specified in Required Navigation Artifacts for Authenticating Claimed Comm Distances and Verifying Achievement and Maintenance of Lunar Orbit, a separate document.)	Technical		GN&C
	Rule 24.D: Competitor Teams shall provide evidence demonstrating their CubeSat has maintained a minimum altitude of at least 300 km above the lunar surface at all times, before intentional end-of-mission disposal maneuvers.	Technical		GN&C
	Rule 24.E: Competitor Teams shall provide evidence, to the Judge's satisfaction, demonstrating that their CubeSats has maintained a lunar orbit (as defined in Rule 24.B) during any operations counting towards competition achievements or prize awards.	Technical		GN&C
	Rule 24.F: In the event that no CubeSat successfully achieves verifiable lunar orbit (as defined in Rule 24.B) within their respective 365-day (calendar days) competition, NASA will declare the Lunar Derby competition over with no winner and no prizes awarded.	Technical & Admin		
	Rule 25: Lunar Derby Prizes Rule			
	25.A: Lunar Propulsion: All contestant Competitor Teams that successfully demonstrate their CubeSat has achieved at least one verifiable lunar orbit and satisfy Challenge Rules and definitions shall be awarded an equal share of the \$1,500,000 Lunar Propulsion Competition Prize, with a maximum of \$1,000,000 to any one Competitor Team.	Technical	Yes	All

Table \_\_\_\_\_ ACS Spacecraft Requirements Matrix

	Rule 25.B: Best Burst Data Rate: \$225,000 will be awarded to the Competitor Team that receives the largest, and \$25,000 will be awarded to the Competitor Team that receives the second largest, cumulative volume of error-free data (above a minimum volume of one 1024 bit data block) from their CubeSat over their best 30-minute operating period while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum volume, they will be awarded \$250,000. If no Competitor Team achieves more than the minimum volume, no Burst Data Rate prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	Rule 25.C: Largest Aggregate Data Volume Sustained Over Time: \$675,000 will be awarded to the Competitor Team that receives the largest, \$75,000 will be awarded to the Competitor Team that receives the second largest, cumulative volume of error free data (above a minimum volume of one thousand 1024 bit data blocks) from their CubeSat over their best contiguous 28-day (calendar day) period while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum volume, they will be awarded \$250,000. If no Competitor Team achieves more than the minimum volume, no Aggregate Data Volume prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	Rule 25.D: Spacecraft Longevity Contest: \$450,000 will be awarded to the Competitor Team that achieve the longest elapsed number of competition days between the first and last confirmed reception (greater than a minimum number of 28 elapsed competition days), and \$50,000 will be awarded to the Competitor Team with the second longest elapsed number of competition days, of an error-free, 1024-bit data block from their CubeSat while satisfying Challenge Rules and definitions. If only one Competitor Team achieves more than the minimum number of 28 elapsed competition days, they will be awarded \$500,000. If no Competitor Team achieves more than the minimum number of competition days, no Longevity Contest prize will be awarded. In case of a tie, all qualifying tied Competitor Teams will receive an equal portion of this prize amount.	Technical	Yes	All
	4.9 Additional Cube Quest Challenge Rules			
	Rule 26: The Centennial Challenge Program (CCP) has made significant effort to develop fair and just competition rules. In the event that the CCP deems it necessary, additional rules or requirements may be administered with the concurrence of all currently registered Competition Team(s). Failure to adopt or follow such additional rules or requirements shall be grounds to terminate a Competition Team and all Team Members from the Challenge.	Admin		