

SPRING 2022 Design CHALLENGE Topics

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| TDC-00 | CHOOSE YOUR OWN ADVENTURE NASA MENTOR: To be assigned | | <ul style="list-style-type: none"> ▪ Majors: ALL ▪ Levels: ALL ▪ Duration: One or Two-Semester ▪ Status: OPEN ▪ Current Teams: 1 ▪ SPECIAL NOTICE: Download topic PDF for information |
| TDC-01 | CREW FORCE LOADING ON PRIMARY AND SECONDARY STRUCTURE NASA MENTOR: James Smith | NASA JSC, Engineering Directorate, Structural Engineering Division | <ul style="list-style-type: none"> ▪ Majors: AE, BME, Eng Phys, ME ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-11 | ALTERNATE CLOTHING WASHING OR SANITIZING SYSTEM FOR LONG DURATION SPACE MISSIONS NASA MENTOR: Robert Trevino | NASA JSC, Engineering Directorate | <ul style="list-style-type: none"> ▪ Majors: All Levels ▪ Levels: All Majors ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-23 | OLFACTORY DELIVERY SYSTEM (ODS) DEVELOPMENT NASA MENTOR: George Salazar | NASA JSC, Human Interface Branch Office | <ul style="list-style-type: none"> ▪ Majors: EE, IE, CE, CHE, CS ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-24 | Initial Mars Base NASA MENTOR: Hum Mandell | UT Center for Space Research / NASA JSC | <ul style="list-style-type: none"> ▪ Majors: ▪ Levels: ALL ▪ Status: OPEN ▪ Current Teams: 1 |
| TDC-25 | ADVANCED SPACECRAFT LIGHTING CONTROL SYSTEM NASA MENTOR: George Salazar | NASA JSC, EV3/Human Interface Branch | <ul style="list-style-type: none"> ▪ Majors: EE, CE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-32 | DUAL-USE WIDEBAND MICROPHONE ARRAY SYSTEM CHALLENGE NASA MENTOR: George Salazar | NASA JSC, Engineering Directorate, Avionics Systems Division | <ul style="list-style-type: none"> ▪ Majors: EE, CE, ME, Physics ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-33 | USE OF SONIFICATION FOR SPACECRAFT SITUATIONAL AWARENESS APPLICATIONS NASA MENTOR: George Salazar | NASA JSC, Engineering Directorate, EV/Human Interface Branch | <ul style="list-style-type: none"> ▪ Majors: TBA ▪ Levels: TBA ▪ Duration: TBA ▪ Status: CLOSED ▪ Current Teams: 0 |

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| TDC-40 | MICRO-G NEUTRAL BUOYANCY EXPERIMENT: ORION CREW SAFETY OR LUNAR SURFACE EVA OPERATIONS (4 CHALLENGE OPTIONS) NASA MENTOR: To be assigned upon acceptance <u>Special Notice Specs:</u> See the Micro-g NExT website | NASA JSC Office of Education | <ul style="list-style-type: none"> ▪ Majors: Interdisciplinary teams ▪ Levels: All Levels ▪ Duration: One or Two Semester ▪ Status: RESERVED ▪ Current Teams: 1 ▪ SPECIAL NOTICE: See Specs for additional information |
| TDC-43 | ANTENNA PERFORMANCE OF STANDARD-BASED CONSUMER COMMUNICATION COMMERCIAL OFF-THE-SHELF (COTS) HARDWARE NASA MENTOR: Chatwin Lansdowne | NASA JSC, Crew and Thermal Systems Division - EC | <ul style="list-style-type: none"> ▪ Majors: EE, CE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-44 | DESIGN OF A THERMAL/CAPILLARY FLIGHT EXPERIMENT NASA MENTOR: John Graf | NASA JSC, EV/Communications System Branch | <ul style="list-style-type: none"> ▪ Majors: CHE, ME ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-45 | VEHICLE INTERCHANGEABLE ELECTRONIC CONTROLLER(VIEC) NETWORK SYSTEM NASA MENTOR: George Salazar | NASA JSC, EV3/ Human Interface Branch | <ul style="list-style-type: none"> ▪ Majors: EE, CE, CS ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-46 | SPACECRAFT LIGHTING NETWORK SYSTEM (SLNS) NASA MENTOR: George Salazar | NASA JSC, EV/Communications System Branch | <ul style="list-style-type: none"> ▪ Majors: EE/CE, CS, AE, Eng. ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-47 | HUMAN-TENDED INFLATABLE LUNAR OUTPOST NASA MENTOR: John Alred | NASA JSC, EV/Communications System Branch | <ul style="list-style-type: none"> ▪ Majors: AE, ME or Materials Eng ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-49 | ANTENNA MOUNTING STRUCTURE FOR LANDER OR ZERO GRAVITY CREWED ENVIRONMENT NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: ME, AE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One or Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-50 | BLUETOOTH TRACKING VIA BEACONS AND ANGLE OF ARRIVAL NASA MENTOR: Justin Bautista | NASA JSC, EV3 Branch | <ul style="list-style-type: none"> ▪ Majors: EE, CE, CS ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |

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| TDC-51 | 3D PRINTED FERROUS EMI-EME SHIELDING NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: EE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-52 | 3D PRINTED CONDUCTIVE EMI-EME SHIELDING NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: EE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-53 | ALTERNATE TREADMILL FOR EXPLORATION MISSIONS NASA MENTOR: Phillip Callen | NASA JSC, Flight Systems Branch/ER3; Software, Robotics, and Simulation Division; Engineering Directorate | <ul style="list-style-type: none"> ▪ Majors: Multidiscipline (ME, EE, CS, BioMed etc.) ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One or Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-54 | MULTI-MOTOR EXERCISE DEVICE FOR SPACE EXPLORATION NASA MENTOR: Phillip Callen | NASA JSC, Flight Systems Branch/ER3; Software, Robotics, and Simulation Division; Engineering Directorate | <ul style="list-style-type: none"> ▪ Majors: Multidiscipline (ME, EE, CS, BioMed etc.) ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One or Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-55 | TACTILE DISPLAY FOR SPACEWALKS NASA MENTOR: Ricco Aceves | NASA JSC, EV3 Branch | <ul style="list-style-type: none"> ▪ Majors: EE/CE, CS, AE, ME ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-56 | DEVELOPMENT OF VARIABLE EMISSIVITY COATINGS/STRUCTURES FOR SPACECRAFT THERMAL MANAGEMENT SYSTEMS NASA MENTOR: Angel Alvarez-Hernandez | NASA JSC, ES3 Thermal Design Branch | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-57 | NOVEL HUMAN RATED SPACECRAFT THERMAL MANAGEMENT SYSTEMS NASA MENTORS: Angel Alvarez-Hernandez | NASA JSC, ES3 Thermal Design Branch | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-58 | NEW DEPLOYABLE RADIATOR DESIGN FOR INFLATABLE STRUCTURES NASA MENTOR: Angel Alvarez-Hernandez | NASA JSC, ES3 Thermal Design Branch | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |

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| TDC-59 | DEVELOPMENT OF DAMAGE TOLERANT/SELF-HEALING HEATER SYSTEMS FOR SPACECRAFT THERMAL MANAGEMENT NASA MENTOR: Angel Alvarez-Hernandez | NASA JSC, ES3 Thermal Design Branch | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-61 | MACHINE-LEARNING HUMAN-COMPUTER INTERFACE SYSTEM (MHIS) NASA MENTOR: George Salazar | NASA JSC, Human Interface Branch | <ul style="list-style-type: none"> ▪ Majors: EE, CE, CS ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-62 | PREVENTION, MITIGATION, OR TREATMENT OF CHRONIC LOW BACK PAIN NASA MENTORS: Bara Reyna, George Salazar | NASA JSC, Exploration Medical Capability Branch | <ul style="list-style-type: none"> ▪ Majors: Kinesiology ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-63 | GREYWATER SYSTEMS FOR LUNAR HABITATS NASA MENTOR: John Graf | NASA JSC, ES Structures and Materials | <ul style="list-style-type: none"> ▪ Majors: AE, ME or Materials Eng ▪ Levels: UPPER DIVISION [SOPH/JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-64 | MAINSTREAM SOLUTIONS FOR LUNAR DUST MITIGATION NASA MENTOR: Kristen John | NASA JSC, Space Technology Mission Directorate (STMD) | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: All Levels ▪ Duration: One-Semester ▪ Status: OPEN ▪ Current Teams: 0 |
| TDC-65 | TRADE STUDY FOR CREW LUNAR ASCENT NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: All Engineering MJRS ▪ Levels: UPPER DIVISION [SOPH/JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-66 | LANDING ZONE STRATEGY FOR LUNAR BASE TRANSPORT NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: All Engineering MJRS ▪ Levels: UPPER DIVISION [SOPH/JR/SR] ▪ Duration: Two-Semester ▪ Status: OPEN ▪ Current Teams: 0 |
| TDC-67 | ANTENNA MOUNTING STRUCTURE FOR LANDER OR MICRO-GRAVITY CREWED ENVIRONMENT NASA MENTOR: Chatwin Lansdowne | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: EE/CE, CS, AE, Eng Phys, ME, Phys ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-68 | PRIVATE CLOUD WITH WIRELESS INTERNET OF THINGS (IoT) | NASA JSC, EV8 Branch | <ul style="list-style-type: none"> ▪ Majors: EE/CS/CE ▪ Levels: UPPER DIVISION [SOPH/JR/SR] |

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| | NASA MENTOR: Chatwin Lansdowne | | <ul style="list-style-type: none"> ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-69 | RADIATION-TOLERANT GRAPHICS PROCESSING UNIT (RGPU) ARCHITECTURE INVESTIGATION NASA MENTOR: George Salazar | NASA JSC, EV3 Human Interface Branch | <ul style="list-style-type: none"> ▪ Majors: EE/CS/CE ▪ Levels: UPPER DIVISION [SOPH/JR/SR] ▪ Duration: Two-Semester ▪ Status: OPEN ▪ Current Teams: 0 |
| TDC-70 | NOVEL NON-HUMAN RATED SPACECRAFT THERMAL MANAGEMENT SYSTEMS NASA MENTOR: Angel Alvarez-Hernandez | NASA JSC, ES3 Thermal Design Branch | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-71 | MACHINE LEARNING AUDIO DENOISING NASA MENTOR: Arjun Sethi | NASA JSC, EV3 Audio Development Team | <ul style="list-style-type: none"> ▪ Majors: CS/SE/CE ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-72 | LUMINOUS NAVIGATION MARKERS FOR LUNAR SURFACE EVAS NASA MENTORS: Toni A. Clark, P.E./George Salazar | NASA JSC, JSC SF3 Leidos (HHP Contract)/EV3 Branch | <ul style="list-style-type: none"> ▪ Majors: EE/ME/IDES/HF/Electronic Design ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-73 | NOVEL NON-TRACKING FIBER OPTIC SOLAR CONCENTRATOR FOR EXTRATERRESTRIAL APPLICATIONS NASA MENTOR: Christopher N. Mendell | Jacob/JETS | <ul style="list-style-type: none"> ▪ Majors: ME/EE/AE/Eng Phys/Math ▪ Levels: All Levels ▪ Duration: Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-74 | PLATFORM FOR LUNAR FOLLOW-ME CAMERA DRONE NASA MENTOR: Chatwin Lansdowne | NASA JSC | <ul style="list-style-type: none"> ▪ Majors: AE, Eng Phys, ME, Phys, Math ▪ Levels: UPPER DIVISION [SOP/JR/SR] ▪ Duration: One Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-75 | MODIFIED SMALL TERRESTRIAL CLOTHES DRYER FOR LONG DURATION SPACE MISSIONS NASA MENTOR: Robert Trevino | NASA JSC, Engineering Directorate | <ul style="list-style-type: none"> ▪ Majors: All Majors ▪ Levels: All Levels ▪ Duration: One or Two Semester ▪ Status: CLOSED ▪ Current Teams: 0 |
| TDC-76 | MODIFIED SMALL TERRESTRIAL CLOTHES WASHER FOR LONG DURATION SPACE MISSIONS NASA MENTOR: Robert Trevino | NASA JSC, Engineering Directorate | <ul style="list-style-type: none"> ▪ Majors: AE, Eng Phys, ME, Phys, Math ▪ Levels: UPPER DIVISION [SOP/JR/SR] ▪ Duration: One Semester ▪ Status: CLOSED ▪ Current Teams: 0 |

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| TDC-77 | <p>DARK MATTERS: QUALIFICATION OF THE BLACKEST BLACK SURFACES & TEXTILES FOR ARCHITECTURAL APPLICATIONS TO CONTROL SCATTERED LIGHT NASA MENTOR: Toni A. Clark, P.E. (Leidos Inc.)</p> | NASA JSC, Lighting Lab | <ul style="list-style-type: none"> ▪ Majors: EE, Ch.E, Materials & Manufacturing Eng, PHYS & Chem, Architecture & Facility Design majors. ▪ Levels: UPPER DIVISION [JR/SR] ▪ Duration: One to Two-Semester ▪ Status: RESERVED ▪ Current Teams: 1 |
| TDC-78 | <p>RECONFIGURABLE LIGHTING SYSTEMS FOR SPACECRAFT HABITATS BEYOND LOW EARTH ORBIT NASA MENTOR: Toni A. Clark, P.E. (Leidos Inc.)</p> | NASA JSC, Lighting Lab | <ul style="list-style-type: none"> ▪ Majors: ME, EE, Architecture, Physics (Optics), Human Factor ▪ Levels: UPPER DIVISION [SOP/JR/SR] ▪ Duration: One to Two-Semester ▪ Status: OPEN ▪ Current Teams: 0 |
| TDC-80 | <p>NASA SUITS (Spacesuit User Interface Technologies for Students) NASA MENTOR: To be assigned upon acceptance</p> <p>Special Notice Specs: See the NASA SUITS website for program information, topics, FAQ, and deadlines. Teams will be participating in both TSGC Design Challenge and NASA SUITS programs. Check deadlines for each program. Continuation for a second semester in Design Challenge is contingent upon NASA selecting the team proposal to continue to Phase 2 of NASA SUITS.</p> | NASA JSC, Office of STEM Engagement | <ul style="list-style-type: none"> ▪ Majors: Interdisciplinary teams ▪ Levels: All Levels ▪ Duration: One or Two Semester ▪ Status: CLOSED ▪ Current Teams: 0 ▪ SPECIAL NOTICE: See Specs for additional information |
| TDC-90 | <p>NASA's BIG Idea Challenge NASA MENTOR: To be assigned upon acceptance</p> <p>Special Notice Specs: See the NASA BIG Idea Challenge website for program information, topics, FAQ, and deadlines. Teams will be participating in both TSGC Design Challenge and NASA BIG Idea programs. Check deadlines for each program. Continuation for a second semester in Design Challenge is contingent upon NASA selecting the team proposal to continue to Phase 2 of NASA BIG Idea Challenge.</p> | | <ul style="list-style-type: none"> ▪ Majors: Interdisciplinary teams ▪ Levels: All Levels ▪ Duration: One or Two Semester ▪ Status: CLOSED ▪ Current Teams: 0 ▪ SPECIAL NOTICE: See Specs for additional information |