Lead

Name: ..... PTT ID: ..... Date: .....

Important Note:
Coordination with Mission Control is required. Tasks for Mission Control are underlined. Mission Control does not have a dedicated checklist and therefore needs to be told every underlined instruction.
Ensuring that the tasks on your checklist are done is your responsibility.
Mission Control is just here to help.

L1. Assign roles (PTT Adapter ID) ☐

- Mission Control: .....
- Rocket Prep 1: ..... ( )
- Rocket Prep 2: ..... ( )
- Pad 1: ..... ( )
- Pad 1: ..... ( )
- Pad 2: ..... ( )
- Pad 3: ..... ( )
- Range Safety: ..... ( )
- Documentation: .....

L2. Request Launch Clearance ☐

L3. Instruct documentation and pad personal to start with prep checklist ☐

Preps

L4. Pull RBF ☐

L5. Run test sequence ☐

L6. Run launch sequence ☐

L7. Insert RBF halfway ☐

L8. Set Holddown Settings ☐

L9. Close fuel main ☐

L10. Request Fueling ☐

L11. Check water state ☐

L12. Check igniters deactivated ☐

L13. Install igniters ☐

- Use fresh PTFE seal
- E-match side up
- Note which igniter (0/1/2/...) installed where (A/B)

- Fully tighten screws

L14. Connect Fincan to Body Tube ☐

L15. Take team photo ☐

L16. Vacate area ☐

L17. Everyone to their post ☐

Filling Preps

L18. Close ox tanking ☐

L19. Open ox vent ☐

L20. Close pressurant tanking ☐

L21. Open pressurant vent ☐

L22. Request Final Preps ☐

L23. Verify igniter continuity ☐

L24. Request Ox Filling clearance from LCO ☐

Terminal Launch Preparation

L25. Go/NoGo Poll ☐

L26. Arm Altimax ☐

Filling
Monitor Ox bottle, ox tank, pressurant, fuel tank pressures

L27. Close ox main ☐

L28. Set Supercharge 30bar, Hysteresis 1bar ☐

L29. Enable Supercharge ☐

L30. Close pressurant vent ☐

L31. Pressurize tanks ☐

L31.1. Open pressurant tanking

L31.2. Quickly close pressurant tanking after first plume

L32. Tare thrust ☐

L33. Close ox vent ☐

L34. Slowly open ox tanking ☐

L35. Activate heating cycle ☐

L36. Quickly close ox tanking, after first plume ☐

L37. Activate cooling cycle ☐
L38. Wait for stable vent frequency ☐
L39. Slowly open ox tanking ☐
L40. Quickly close ox tanking, after first plume ☐
L41. Open Ox vent ☐
L42. Start remote cameras ☐
L43. Enable internal cameras ☐
L44. Set Supercharge 60bar, Hysteresis 1bar ☐
L45. Open pressurant tanking ☐
L46. Wait for stable pressures ☐
L47. Close pressurant tanking ☐
L48. Open pressurant vent ☐

Launch

L49. Go/NoGo (TRS camera points to receiver) ☐
L50. Activate umbilical retract ☐
L51. Verify clean separation ☐
L52. Switch to internal power ☐
L53. Launch ☐

Safe GSE and Rocket after Abort
Rocket is fully pressurized

L54. Open supercharge ☐
L55. Close supercharge after pressure in tank is zero ☐
L56. Verify no heat sources ☐
L57. Open fuel main OR Wait for fuel bleed to vent ☐

Safe GSE

L58. Stop remote cameras ☐
L59. Stop pad cameras ☐
L60. Instruct Pad to close Ox bottle ☐
L61. Instruct Pad to close Pressurant bottle ☐
L62. Vacate area ☐

L63. Open ox tanking ☐

L64. Open pressurant tanking ☐

L65. Verify all pressures are zero ☐

L66. Announce "safe state" ☐

Pad Preperation

Name: ..... PTT ID: ..... Date: .....

P1. READ THE WHOLE CHECKLIST BEFORE STARTING ☐

Pad preparation

P2. Pack tools ☐
P3. Place trailer in front of container ☐
P4. Connect GSE to Server ☐
P5. Fill hot water ☐
P6. Fill cold water ☐
P7. Weight Ox bottle and check if enough ☐
P8. Install Ox bottle ☐
P9. Instruct MC to activate cooling cycle ☐
P10. Add ice to cold water, regularly check and add more ☐
P11. Check sensors
- P11.1. Hot water temperature ☐
- P11.2. Cold water temperature ☐
- P11.3. Mantle water temperature ☐
- P11.4. Pressurant pressure ☐
- P11.5. Ox pressure ☐

P12. Check actuators (verify movement and calibration)
- P12.1. Ox tanking valve ☐
- P12.2. Ox vent valve ☐
- P12.3. Pressurant tanking valve ☐
- P12.4. Pressurant vent valve ☐
- P12.5. Umbilical retract ☐
- P12.6. Hot water pump ☐
- P12.7. Cold water pump ☐
- P12.8. Holddown ☐

P13. Move trailer at test position ☐
P14. Install Pressurant bottle ☐
P15. Mount flame diverter ☐

Rocket mounting (Static Fire)

P16. Slide rocket into rail ☐
P17. *Mount T-Nut underneath lower rail button ☐
P18. *Mount scale above lower rail button ☐
P19. *Secure rocket with plate on top ☐
P20. *Secure rocket with steel cable ☐
P21. *Secure rocket with "loose" strap ☐
P22. Connect Ox umbilical ☐
P23. Connect Ox pressurant umbilical ☐
P24. Connect Fuel pressurant umbilical ☐
P25. Connect Electrical umbilicals ☐
P26. Pull RBF Pin halfway ☐
P27. Vacate area, everyone to their position. ☐

Rocket mounting (Launch)

P28. Slide rocket into rail ☐
P29. Mount scale underneath lower rail button ☐
P30. Secure holddown above lower rail button ☐
P31. Ensure holddown locked ☐
P32. Connect Ox umbilical ☐
P33. Connect Ox pressurant umbilical ☐
P34. Connect Fuel pressurant umbilical ☐
P35. Connect Electrical umbilicals ☐
P36. Pull RBF Pin halfway ☐
P37. Vacate area, everyone to their position. ☐

Fueling

P38. Fill fueling syringe with ethanol ☐
P39. Fuel ☐
P40. Clean up spills ☐

Final Preps
Constant communication to MC required

P41. Verify holddown closed ☐

P42. Open Ox bottle ☐

P43. Check for leaks ☐

P44. Open Pressurant bottle ☐

P45. Check for leaks ☐

P46. Check and note pressure ☐

P47. Start pad cams ☐

P48. Pull RBF Pin ☐

Rocket

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R1. Prepare igniters ☐

(a) Print cartridges (min. 5) ☐
(b) Cut e-match wires to length, strip insulation ☐
(c) Insert e-matches into cartridges, bend wires ☐
(d) Label each igniter with a number ☐
(e) Weigh each cartridge with e-match, note masses ☐
(f) Mix powdered ingredients ☐
- $3.0\,\mathrm{g}$ KNO3
- $2.0\,\mathrm{g}$ Sugar
- $1.5\,\mathrm{g}$ Mg

(g) Cook mixture at $220\,^{\circ}\mathrm{C}$ until sticky/mushy, stirring constantly ☐
- Wear safety glasses, mixture could ignite.
- If mixture starts smoking, turn down the heat, else it will ignite.

(h) Fill cartridges with mixture ☐
- Avoid leaving voids
- Make contact with but don't fully cover e-matches

(i) Let igniters cool down ☐
(j) Weigh each igniter, note masses ☐
(k) Photograph each igniter with the top and number visible ☐
(l) Test batch, document on video ☐
- Burn excess mixture
- Test one igniter (note number)

Streaming [WIP]

Name: ..... PTT ID: ..... Date: .....

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S1. READ THE WHOLE CHECKLIST ☐

S2. Check with Test Lead / Mission Control if they want to be notified of your progress on the stream preparations. This does not affect the final "We are going live" information. ☐

S3. Talk with Test Lead about what the plan for today's test is (Which components are being tested, what results do we expect from this test, basic data like burn duration, used propellants, etc) ☐

Physical Setup

S4. Clean the table you're going to use for streaming (if it's in the workshop). Default location is on the table next to the stairs to Mission Control ☐

S5. Bring Streaming PC from wherever it is to the prepared table. Set up the Streaming PC *on* the table, as the workshop floor is very dirty
(Note: If you can't find it, the Streaming PC should be labeled as such and is usually in the HQ below one of the desks or set up as a SolidWorks workstation) ☐

S6. Bring peripherals and needed cables. These include:

- Screen (+ screen and power cable) ☐
- Mouse (+ depending on the mouse, a mouse pad) ☐
- Keyboard ☐
- Power cable for PC ☐
- Webcam (optional, but preferred) ☐

☐

S7. Set up network if needed. The router labeled with "Teststand" has to be connected with the Ethernet Jack next to the laminating room (Only one of the two jacks work!). Then take a Gigabit switch, connect it to the router, connect the ethernet cable from Mission Control to the switch and connect the computer *to the switch* (the router is limited to 100MBit/s which can bottleneck the network cameras) ☐

S8. Make sure everything is ready to start Software setup (Computer can start, has network connection, recognizes all peripherals, ...)

Software Setup

S9. Run Streamlabs OBS ☐

S10. Make sure all inputs are working properly ☐

- Check audio levels in mixer. Do a short test recording to hear if audio is good (Headphones are helpful for this) ☐
- Check if webcam is being recognized. Often you need to open the properties of the webcam source in Streamlabs for it to start recording, otherwise it's just black ☐
- Check if internet connection is good by visiting a site like fast.com or speedtest.net. For a 1080p stream there should be at least 10Mbit/s upload speed ☐

S11. If you are new to streaming also read the StreamingForBeginners.txt in the Streaming folder on the Desktop [WIP] ☐

S12. Check if the scene transitions work properly (Default transition is set right, media sources are found) ☐

S13. Check connection to network cameras by opening VLC Streams for all cameras at once.

- Open VLC and open a new network stream (In the menu under "Media", or by pressing Ctrl+N)
- Enter network URL (`rtsp://192.168.1.64-67` , credentials are `admin` and `SpaceTeam2020`)
- Repeat for every camera (should be 4). *Note: The current streaming PC struggles with more than 2 cameras playing back at once, so issues in playback (visual glitches) may not be a network issue, but the CPU maxing out*
  ☐ `.64` ☐ `.65` ☐ `.66` ☐ `.67`

☐

S14. Close all VLC windows to reduce unneccessary strain on the CPU and network

S15. If the Test is using Discord for coordination, open Discord, mute your mic and join the channel. You can do that on either a mobile phone or the streaming PC, *but if you use the PC, mute Desktop audio in Streamlabs so the Mission Control audio is not audible in the stream. CHECK IF YOU DID THAT PROPERLY* ☐⚠

S16. Perform a dry run of all the scene changes. Note that if you're in Studio Mode the "preview" scene often isn't rendered correctly (the intro video doesn't load, network camera stream doesn't start), but it will work when switching that scene to live. Most of the time. ☐

S17. Prepare a YouTube Stream title and description [Instructions TBD]. You can enter it in the YouTube dashboard already, but upon going Live Streamlabs prompts you to update it anyways ☐

Start Streaming

S18. Possibly wait if test preparations are not very far, optimally aim for stream begin about half an hour before fueling (which should be about an hour before T-0)

S19. Inform Test Lead (and possible bystanders) that you are about to go live ☐⚠

S20. Switch to Intro Scene ☐⚠

S21. Mute microphone audio ☐⚠

S22. Click "Start Streaming" button in Streamlabs, enter the Stream information you prepared earlier ☐

S23. Send a notice into Slack (general channel) with a stream link ☐

S24. Wait for a few minutes in the Intro Scene, possibly prepare what you're going to say, then unmute and switch scenes (Starting with the Webcam view if available) ☐