This is an approximately 20-minute briefing on SLS for general public audiences.

General themes of this briefing:
1) NASA has begun a new era of human space exploration, with the goal of landing humans on Mars.
2) To carry out that mission, NASA is building the Space Launch System, the world’s most powerful rocket.
3) Space Launch System is currently under construction, with substantial amounts of hardware already created and testing well underway.
4) Because of its unrivaled power, SLS can perform missions no other rocket can, like game-changing science and human landings on Mars.
1) The Journey to Mars has begun; NASA has begun a series of missions that will result in astronauts taking the first steps on the Red Planet.

2) Today, the International Space Station, supported by Commercial partners, is allowing us to gain knowledge that will make the journey possible.

3) Robotic explorers are currently on the Martian surface and in orbit, helping us to better understand the Red Planet and prepare to send humans.

4) In the coming years, NASA will launch a series of missions, beginning in the space around the moon and then going farther out, that will demonstrate new systems and capabilities that will enable the journey.

5) SLS and Orion are the first new systems that will make the journey possible.
This shows the major features of the Block 1 version we are developing now.

- Our driving requirements are safety, affordability and sustainability.
- The key to that is making best use of common elements, existing investments in technology, infrastructure and workforce, the inherent advantages of heavy lift, and an evolvable vehicle design.
- Current configuration is the result of literally thousands of trades involving cost, performance, stages, mission architecture, etc.
- 70 metric tons payload (154,000 lbs)
- Designed for affordability – based on the Space Shuttle heritage RS-25 engine and the solid rocket booster both upgraded for performance: 109 vs. 104 percent power for RS-25 and 5-segment vs. 4-segment booster for 20 percent more power on the boosters.
- Upper stage for first mission is the Interim Cryogenic Stage, based on the Delta Cryogenic Second Stage.
- We formally stood up this program in September 2011.
- Manufacturing under way on every major component, including test and flight hardware.
SLS offers unrivaled benefits for a variety of missions.

- Block 1 provides greater mass lift than any contemporary launch vehicle.
- SLS Block 1 has 10 percent more thrust than the Saturn V.
- With 8.4m and 10m fairings, SLS will offer greater volume lift capability than any other vehicle.

A key feature of the design is a clear path to evolve to greater capability as missions become more challenging.

- The Block 1 SLS leverages heritage hardware and technology to support affordable development and reduce risk.
- The SLS Program is finding ways to upgrade those Block 1 systems to improve performance so we can evolve the Block 1 vehicle to a Block 2 variant with more thrust off the pad and more payload. It will have a larger cargo fairing, a new upper stage, and advanced boosters.
- Block 1 is 322 feet tall. Block 2 will be 365 feet tall with 130 metric tons of payload and the largest payload volume in history.
- Using legacy hardware and infrastructure keeps our funding profile flat, yet delivers near-term capability using available assets and advanced hardware well into development.
- By leveraging existing capabilities and planning for evolution based on commonalities, SLS will evolve into the most powerful launch vehicle ever flown, while honoring those three driving objectives: safety, affordability, and sustainability.
1) Core Stage will be the tallest rocket stage ever flown.

2) Core Stage is being built at Michoud Assembly Facility outside New Orleans, LA, using state-of-the-art manufacturing tools, including the world’s largest welding tool.

3) Flight hardware and test article tanks, 27.6 feet across, are currently being produced at Michoud, including: weld confidence articles, structural test articles and EM-1 flight articles.
28 seconds – LOX qual tank removal and break-over

Also produced engine section test article and flight article and LH tank confidence and test article.
Clockwise from upper left:

- LVSA structural test article completed at MSFC this year
- Core Stage Liquid Hydrogen test stand at MSFC, one of 5 test facilities that will test core stage components
- ICPS structural test article completed 2015 at ULA in Decatur, Alabama, delivered to MSFC for testing in 2016
- Stennis Space center B2 green run test stand work packages under way
- Lengthened Pegasus barge outfitted to support transportation to MSFC and KSC

Other Testing:

- Base heating
- Wind tunnel
• You are part of the core stage avionics team, so I’d like to take a moment to show you where you fit into SLS.

• This image shows the location of all SLS avionics – excluding Orion avionics.
• MSFC facilities for testing SLS Block 1 avionics and software – the Integrated Avionics Test Facility.
• Integrates the various components shown in previous slide.
• Capable of virtually flying simulated missions using real avionics hardware and software.
30 seconds - March 2016 time lapse video of SITF Q setup
1) The Space Shuttle used a solid rocket booster with four propellant segments; the SLS boosters add a fifth segment for more power. It provides 3.6 million pounds maximum thrust.

2) The case hardware for the first flights of SLS is currently in inventory at Kennedy Space Center.

3) A first qualification test of the booster was successfully completed in March 2015

4) QM-2 was test fired in June 2016. Disassembly is ongoing but preliminary indications look good.

5) Flight motors are being cast now for shipment to KSC.

Booster Facts: 177 feet tall, 12 feet in diameter. Each weighs 1.6 million pounds (as much as four blue whales) and generates up to 3.6 million pounds of thrust.
26 seconds - motor casting at OATK and QM-2 highlights

- Interesting high speed camera footage of ignition shock wave and motor nozzle plug blowing out
1) The Space Shuttle was powered by three RS-25 engines, which were continuously updated throughout the shuttle program.

2) SLS will use four RS-25 engines – each roughly 500,000 pounds of thrust – and has made further upgrades to leverage current technology.

3) Engines for the first four flights are currently in inventory at Stennis Space Center in Mississippi, including 14 heritage flown engines and two new engines, all from the shuttle program.

4) The first SLS test series of the engine was conducted in 2015; a flight engine test was conducted in March 2016, and additional testing will prepare for the Green Run test firing of Core Stage in 2017.
25 seconds – engine assembly and hotfire test at SSC

- “Adaptation” tests in 2015 and 2016 to adapt the engines to variety of SLS requirements and environments including:

Increased propellant inlet pressures and lower temperatures, throttle profile, pre-launch engine conditioning, new engine controllers and software.
34 seconds – SLS launch day beauty shot and initial ascent

- This is what we are all working toward, the EM-1 mission now set for late 2018.
- Ambitious schedule of manufacturing and testing for the next 2 years.
Thank the audience, remind them that this is THEIR space program, and encourage them to join on us the journey with the social media links listed.