WELCOME TO TODAY'S UPDATE ON NASA'S HUMAN DEEP SPACE EXPLORATION PROCESS, AND THANKS FOR JOINING US IN FIRING ROOM ONE IN THE LAUNCH CONTROL CENTER AT KENNEDY SPACE CENTER.

WITH US TODAY ARE DAN DUNNBACHER, DEPUTY ASSOCIATE ADMINISTRATOR FOR EXPLORATION SYSTEMS DEVELOPMENT, MARK Geyer, ORION PROGRAM MANAGER, TODD MAY, SPACE LAUNCH PROGRAM ADMINISTRATOR, AND PEPPER PHILLIPS, GROUND SYSTEMS AND OPERATIONS DEVELOPMENT MANAGER.

FOR THOSE OF YOU JOINING US ON NASA TV AND SOCIAL MEDIA, IF YOU'D LIKE TO ASK A QUESTION DURING THE BRIEFING, USE THE HASH TAG #ASKNASA.

WITH THAT, DAN?
THANK YOU, RACHEL, AND GOOD AFTERNOON, EVERYONE, AND WELCOME TO THIS LITTLE BRIEFING.

FIRST OF ALL, WELCOME TO CENTRAL FLORIDA FOR TOMORROW'S SPACEX LAUNCH.

A VERY KEY PART OF OUR OVERALL INTEGRATED EXPLORATION MISSION THAT INCLUDES THE CREW AND CARGO RESUPPLY FOR SPACE STATION AS WELL AS THE WORK WE'LL BE TALKING ABOUT WHICH IS OUR BEYOND EARTH ORBIT EXPLORATION. THE INTEGRATION WITH OUR BRETHREN WITH THE COMMERCIAL CARGO AND CREW IS VERY IMPORTANT.

THEY FLY TOMORROW.

WE ARE WORKING VERY DILIGENTLY TO OUR FIRST TEST FLIGHT WHICH
WILL COME UP IN SEPTEMBER OF 2014 CALLED EXPLORATION FLIGHT TEST ONE. IN THAT FLIGHT TEST, IT'S PRIMARILY TO GET SOME GOOD TEST DATA FOR THE ORION SPACECRAFT AND MARK WILL TALK ABOUT THAT. BUT IT ALSO IS A VERY GOOD INTEGRATED FLIGHT TEST PLAN WHERE FLIGHT TEST OBJECTIVES FOR THE SPACE LAUNCH SYSTEM AS WELL AS OUR GROUND SYSTEM AND OUR RECOVERY EFFORTS THAT WE WILL ULTIMATELY NEED FOR OUR CREWED MISSIONS WITH ORION AND THE SPACE LAUNCH SYSTEM. IT'S A VERY IMPORTANT FLIGHT TEST FOR US. IT'S A VERY KEY IMPORTANT MILESTONE FOR THE TEAM AND FOR ALL OF OUR EFFORTS.
AND WE'RE LOOKING FOR FORWARD TO THAT.

AND YOU CAN SEE SOME OF THE HARDWARE HERE AT KSC AS WE MOVE FORWARD.

IT IS A VERY KEY ELEMENT OF OUR OVERALL PLAN TO GET HUMANS BACK BEYOND EARTH ORBIT AS QUICKLY AS WE CAN.

OUR NEXT FLIGHT TEST FOLLOWING EXPLORATION FLIGHT TEST ONE WILL BE OUR EXPLORATION MISSION ONE IN THE 2017 TIME FRAME.

AND THE TEAM IS WORKING VERY HARD FOR THAT.

SO AGAIN, WE'RE EXCITED TO BE HERE.

WE'RE EXCITED TO WATCH THE DEVELOPMENT OF THE OVERALL NASA'S INTEGRATED PLAN FOR HUMAN EXPLORATION FROM INTERNATIONAL SPACE STATION OUT TO MOON, ASTEROID, AND EVENTUALLY TO
MARS.

AND WE LOOK FORWARD TO IT, AND THANK YOU FOR YOUR INTEREST.

MARK?

>> THANK YOU, DAN.

SO AS DAN MENTIONED, SEPTEMBER, 2014, THAT'S ONLY 19 MONTHS AWAY.

WE'VE GOT A LOT OF WORK GOING ON TO GET READY FOR THAT FLIGHT.

THE PICTURE THAT WE'RE SHOWING HERE IS ACTUALLY THE CREW MODULE WHICH IS BEING ASSEMBLED RIGHT HERE IN -- AT KSC IN THE ONC BUILDING.

THAT'S WHERE ALL THE AVIONICS, THE CABLES, TUBING, SECONDARY STRUCTURE, HEAT SHIELD, PARACHUTES AND EVERYTHING ELSE
AND THE SERVICE MODULE ITSELF
WILL BE INSTALLED AND ASSEMBLED

HERE.

WE'LL PUT THE LAUNCH SYSTEM ON
IT AND STACK IT ON A DELTA FOUR,

THE LAUNCH VEHICLE WE USE.

THE ESC ONE FLIGHT WILL BE TWO
ORBITS.

THE SECOND WILL BE HIGH
ALTITUDE, 3,000 MILES, THE

FARDEST WE'VE EVER TAKEN A
HUMAN SPACECRAFT SINCE WE WENT

TO THE MOON WITH "APOLLO."

3,000 MILES, THINK ABOUT IT,
ABOUT 15,000 MILES WITH THE

SPACE STATION ALTITUDE.

IT'S WAY UP THERE.

THE REASON WE'RE DOING THAT IS
WE GET TO 84% OF THE ENTRY

VELOCITY THAT WE WOULD SEE
COMING BACK FROM THE MOON.

74 00:04:07,318 --> 00:04:11,858
IT ALLOWS US TO STRESS THE HEAT SHIELD THAT'S GOING TO BE CLOSE

75 00:04:11,859 --> 00:04:14,528
TO WHAT WE'LL SEE WHEN WE COME BACK FROM THE REGION AROUND THE MOON.

76 00:04:14,528 --> 00:04:15,528
WE'RE ALSO INSTRUMENTING THE HEAT SHIELD WITH

77 00:04:15,528 --> 00:04:16,668
STATE-OF-THE-ART INSTRUMENTS THAT ALLOW US IT ACTUALLY

78 00:04:16,668 --> 00:04:19,060
MEASURE NOT JUST THE HEAT BUT THE PLASMA THAT WE'RE GOING TO

79 00:04:19,060 --> 00:04:21,738
LOOK AT WHICH ALLOWS US TO MAKE OUR MODELS ON EARTH MUCH BETTER

80 00:04:21,738 --> 00:04:24,959
SO WE CAN MAKE HEAT SHIELDS LIGHTER, SAFE, MORE RELIABLE.

81 00:04:24,959 --> 00:04:28,818
AND THIS IS WHY WE'RE DOING THIS.

82 00:04:28,819 --> 00:04:30,550
WE'RE ALSO GOING TO EXERCISE SEVEN OF THE TOP TEN RISK AREAS

83 00:04:30,550 --> 00:04:35,319
IN THE ORION DESIGN INCLUDING THE HEAT SHIELD.
THAT ALSO INCLUDE PARACHUTE DEPLOYMENT.

IT INCLUDES NAVIGATION AND GUIDANCE.

INCLUDES ALL THE SOFTWARE THEY'RE GOING TO EXERCISE ON THE FLIGHT, AS WELL AS KEY AREAS, LIKE I SAID, WITH NAVIGATION AND GUIDANCE AND THEN SEPARATION EVENTS.

WE HAVE SOME -- LAUNCH ABOARD SYSTEM WILL COME OFF.

WE HAVE LARGE BEARINGS ON THE SERVICE MODULE THAT WILL BE DEPLOYED.

SEPARATION EVENTS ARE IMPORTANT PART OF THE FLIGHTS.

WE'LL TEST THOSE IN THE ENVIRONMENTS THAT WE'RE GOING TO SEE WHEN WE ACTUALLY PUT PEOPLE ON BOARD.

THEY'RE ALL REAL IMPORTANT TO US TO MAKE SURE THAT WE ALL HAVE
Great models, but when you fly it in the environment it will behave as you expect.

That's why EFT one is so important for Orion.

Some things that are not as glamorous as, say, hot heat shields and parachute deployment, but we're also reinvigorating the supplier base here in the United States for high-tech parts.

Titanium parts, composite parts, triple-E parts, avionics, things that are -- since the shuttle has come down, there's not a lot of business in these areas, and we've reinvigorated that team.

Recertified for people, making parts and making coatings.

That's a big part not just of
ORION BUT ALSO KEEPING UNITED STATES TECHNOLOGY EDGE THERE.

ANOTHER INTERESTING THING ABOUT THIS PROGRAM IS THE DATA THAT WE GET FROM THESE FLIGHT TESTS, NOT ONLY INFORM ORION FOR EM-1 AND THE OTHER MISSIONS WE'LL DO, BUT WE PROVIDE HUNDREDS OF DATA PRODUCTS TO THE COMMERCIAL PROVIDERS THAT DAN TALKED ABOUT THAT ARE GOING TO BE FLYING ISS. PARACHUTE DATA, HEAT SHIELD DATA, AERODYNAMIC DATA BASE.

THIS IS ONE OF THE SPINOFFS THAT THIS PROGRAM PROVIDES FOR THE GUYS GOING TO LOWER EARTH ORBIT.

IT'S GOING TO BE A GREAT FLIGHT FOR US. VERY EXCITING.
AND IT'S ALL HAPPENED HERE, RIGHT HERE IN FLORIDA.

>> SO IT MIGHT NOT BE INTUITIVELY OBVIOUS WHY AN SLS GUY IS SITTING HERE FOR A FLIGHT THAT'S GOING TO BE ON THE DELTA.

BUT AS IT TURNS OUT, THERE'S A LOT OF THINGS ABOUT THE MISSION THAT HELPS THE SLS AS WELL AS WE'RE HELPING THE MISSION TO BE SUCCESSFUL.

AS FAR AS THE FORMER, IT TURNS OUT THAT A LOT OF THE DATA THAT MARK'S TALKING ABOUT WHERE WE'RE HIGHLY INSTRUMENTING THIS IS DATA THAT WE'RE GOING TO USE TO UNDERSTAND THE STRUCTURAL PROPERTIES, THE AERO LOADING, ENVIRONMENTAL LOADING, GUIDANCE.
NAVIGATION AND CONTROL, SEPARATION LOADS, THAT WE FEED BACK INTO THE INTEGRATED STACKED LOADS FOR OUR FIRST FLIGHT, EM-1.

IT TURNS OUT THAT WE'RE ALSO BUILDING AN ADAPTER THAT WE DELIVER TO MARK USED KIND OF A SKUNK-WORKS THEME.

IT WAS A TWO-YEAR EFFORT.

THE PICTURE YOU SEE HERE IS ACTUALLY THAT -- WE CALL IT THE MSA.

THAT'S ACTUALLY A DESIGN LAUNCH BUILD AND USED MULTIPLE TIMES.

THAT FLIES ON THE EFT-1 FLIGHT AND WILL FLY ON EM-1 AND EM-2.

THAT'S ACTUALLY BEING BUILT IN -- AT MARSHALL SPACEFLIGHT CENTER AS WE SPEAK.
WE'RE WELDING THE FLIGHT ARTICLE NOW TODAY.

THERE'S A COUPLE CONNECTIONS HERE BETWEEN US ON THIS MISSION.

SLS IS PROCEEDING VERY WELL RIGHT NOW.

WE ARE HEADING INTO VEHICLE PDR THIS SUMMER.

WE HAVE PURCHASED MOST OF THE TOOLING THAT GOES INTO MISHU.

AND OVER THIS YEAR, THOSE -- THOSE TOOLS ARE GOING TO BE INSTALLED THERE, INCLUDING ONE OF THE TALLEST WELDING MACHINES EVER BUILT AT OVER 160-FEET TALL.

WE ALSO ARE HEADING INTO A TIME WHERE WE WILL TAKE THE J2X OFF THE STAND IN STENNIS AND RECONFIGURE IT FOR THE RF-25 TESTING TO GET THOSE ENGINES READY TO GO ON TO THE FIRST EM-1 FLIGHT.
AS WE SPEAK, WE'RE PUTTING TOGETHER THE QUALIFICATION MOTOR FOR THE BOOSTER QUALIFICATION TEST LATE THIS YEAR.

AND ALL THOSE THINGS ARE PROCEEDING ON TRACK.

AND WE'RE LOOKING FORWARD TO BEING BACK DOWN HERE FOR AN EVENT LIKE THIS IN DECEMBER OF 2017.

>> SO AS THE LOCAL GUY, KFC GUY, I WELCOME YOU TO KFC.

I KNOW DAN MENTIONED THAT THIS IS WHERE IT ALL COMES TOGETHER.

SO WE'RE REALLY PROUD TO DISPLAY WHAT'S BEEN GOING ON AROUND THE CENTER.

TALK ABOUT EFT-1 FIRST.

SO OUR INVOLVEMENT IN THAT MISSION IS TWOFOLD REALLY.

THE ACTIVE PART IS WHAT DAN
MENTIONED IS THE LANDING AND

00:09:02,399 --> 00:09:05,319
OUR TEAM IS GOING TO BE THE ONE
EXECUTING THAT LANDING AND

00:09:05,320 --> 00:09:06,320
RECOVERY.

00:09:06,320 --> 00:09:08,670
OF COURSE, WE'RE DOING IT WITH
THE DOD COMMUNITY.

00:09:08,669 --> 00:09:11,339
SO IT'S OUR PARTNERSHIP TO GO
OUT THERE AND RECOVER OFF THE

00:09:11,340 --> 00:09:12,730
WEST COAST.

00:09:12,730 --> 00:09:16,720
THE TEAMS ARE EXERCISING SOME
STATIC TESTS NOW, BUT WE'RE

00:09:16,720 --> 00:09:19,060
GOING TO BE READY WITH THIS
FIRST FULL-UP ACTIVE TEST WITH A

00:09:19,059 --> 00:09:20,589
LIVE SPACECRAFT.

00:09:20,590 --> 00:09:24,970
AND THAT, WHAT'S DIFFERENT IS WE
GET TO GO OUT AND RECOVER

00:09:24,970 --> 00:09:25,970
PARACHUTES.

00:09:25,970 --> 00:09:28,970
THE FORWARD BAY COVERS, THAT
ENTIRE RECOVERY OPERATION IS
GOING TO BE END TO END DONE ON THE WEST COAST.

ONCE WE RECOVER, WE BRING IT IN SURE AND WILL BE SERVICING THE SPACECRAFT ON THE WEST COAST.

THAT'S A CHANGE FROM WHAT WILL BE OUR BASELINE, OUR DESERVICING.

O, WE'LL BE BACK HERE AT KFC AS A NOMINAL PLAN.

THE DE-SERVICING IS NOT READY TO BE DONE HERE AT KFC.

WE'RE TAKING ADVANTAGE OF ASSETS OUT WEST.

THEN WE'RE GOING TO TRANSPORT IT BACK OVER LAND, BACK TO KFC.

WE'LL EXERCISE THAT PROCESS AND LEARN FROM IT.

ELSEWHERE, KFC, WE'RE GETTING READY FOR EM-1.

IF YOU HAVE HAD THE CHANCE TO SEE THINGS GOING ON.

THE OBVIOUS ONES, THE ONES THAT
ARE BIG.

193
00:10:06,470 --> 00:10:07,990
YOU SEE OUT AT THE PAD.

194
00:10:07,990 --> 00:10:11,169
WE'RE REFURBISHED -- DOING A LOT
OF REFURBISHMENT WORK.

195
00:10:11,169 --> 00:10:16,479
WE'VE JUST COMPLETED SOME WORK
LIKE ON THE HYDROGEN SPHERE AND

196
00:10:16,480 --> 00:10:19,480
THE OXYGEN SPHERE AND THE WATER
TANK.

197
00:10:19,480 --> 00:10:21,879
THOSE ARE BIG ITEMS THAT YOU SEE
AT THE PAD THAT REFURBISHED.

198
00:10:21,879 --> 00:10:25,279
ESSENTIALLY WE'VE GOT A STRIPPED
DOWN VERSION OF THE OLD PADS,

199
00:10:25,279 --> 00:10:28,169
THE OLD SYSTEMS HAVE COME OUT.

200
00:10:28,169 --> 00:10:29,169
WE'VE -- WE'VE ARE YOUER IS
04:27:45:FASS

201
00:10:29,169 --> 00:10:31,549
-- WE'VE RESURFACED THE CONCRETE
SLOPE.

202
00:10:31,549 --> 00:10:34,559
WE'RE GETTING INTO THE DETAILED
SYSTEMS AT THE PAD.

203
00:10:34,559 --> 00:10:37,849
THE ENVIRONMENTAL CONTROL
SYSTEM, HVAC SYSTEMS.

204
00:10:37,850 --> 00:10:41,570
THOSE ARE THE ONES BEING REVAMPED TODAY.

AND THE VAB, WE'VE REMOVED THE PLATFORM, THE OLD PLATFORM SET FOR SHUTTLE OUT OF HIGH BAY THREE.

THAT EFFORT IS -- IS FINISHING UP.

MEANWHILE, WE'RE COMPLETING OUR DESIGNS IN CONJUNCTION WITH TODD'S TEAM TO MAKE SURE WE'VE GOT A RECONFIGUREABLE PLATFORM SET THAT ALIGN TO HIS OUTER MOLD LINE AND INTERFACES THAT HE REQUIRES.

ELSEWHERE, OF COURSE, THERE'S THE BIG MOBILE LAUNCHER.

THE EAST REFURB PARK SITE.

THAT'S COME ALONG WELL.

WE'VE GOT OUR DESIGN NEAR COMPLETE ON THE STRUCTURAL MODS.
THAT WE'LL HAVE TO DO TO THE VEHICLE TO RECONFIGURE IT FROM THE OLD AIRES CONFIGURATION TO WHAT WE'LL BE DOING FOR SLS AND ORION.

WE EXPECT, IN FACT, TO ADVERTISE AN AWARD CONTRACT THIS FISCAL YEAR TO DO THE CONSTRUCTION ON THAT WORK.

AND THEN OF COURSE THERE'S A CRAWLER TRANSPORTER THAT'S RIGHT NOW, CRAWLER TRANSPORTER TWO IS THE ONE WE'RE PLANNING ON USING FOR FLS.

OF COURSE, WE'RE SINGLE STRING, SO THAT'S THE ONE WE'RE FOCUSING ON, WE'RE USING CRAWLER TRANSPORTER ONE TODAY TO MOVE ASSETS WHILE CRAWLER TRANSPORTER TWO IS GOING THROUGH ITS MAJOR MOD PERIOD.
WE DID HAVE OUR, BACK IN NOVEMBER IF YOU RECALL, WE HAD

229
00:11:55,230 --> 00:11:58,430
OUR VERIFICATION AND VALIDATION TEST WITH ODD WORK WE'VE DONE ON

230
00:11:58,429 --> 00:12:00,509
CRAWLER TRANSPORTER TWO.

231
00:12:00,509 --> 00:12:03,450
IT WAS REALLY, IT WAS REALLY LIFE EXTENSION MODS.

232
00:12:03,450 --> 00:12:07,610
NOW WE'RE GOING INTO THINGS THAT WE REQUIRE SPECIFICALLY FOR SLS

233
00:12:07,610 --> 00:12:11,960
AND ORION CAPABILITY WHICH IS BASICALLY OPERATING IT FROM 12

234
00:12:11,960 --> 00:12:19,190
MILLION POUNDS -- UPGRADING FROM 18 MILLION POUNDS TO 18 MILLION

235
00:12:19,190 --> 00:12:20,620
POUNDS.

236
00:12:20,620 --> 00:12:23,580
WE HAVE ROLLER BEARING FABRICATION, PRIMARY

237
00:12:23,580 --> 00:12:27,259
WEIGHT-BEARING ITEMS ON THE TRUCKS, ON THE CRAWLER

238
00:12:27,259 --> 00:12:28,259
TRANSPORTER.

239
00:12:28,259 --> 00:12:29,850
SO THAT'S END WORK.

240
00:12:29,850 --> 00:12:32,570
WE'VE GOT SOME OTHER ACTIVITIES
THAT WE’VE ALREADY COMPLETED

241 00:12:32.570 --> 00:12:34.760 SUCH AS MODIFYING THE BRAKES.

242 00:12:34.759 --> 00:12:36.490 AGAIN, WE’VE CHECKED THOSE OUT.

243 00:12:36.490 --> 00:12:40.310 SO THE TEAM HERE AT KFC IS EXCITED ABOUT EFT-1’S

244 00:12:40.309 --> 00:12:42.289 OPPORTUNITY TO LEARN.

245 00:12:42.289 --> 00:12:46.559 ONE ASPECT THAT I NEED TO POINT OUT SINCE WE’RE SITTING IN IT IS

246 00:12:46.559 --> 00:12:48.919 FLIGHT FOLLOWING FOR EFT-1.

247 00:12:48.919 --> 00:12:52.679 THIS ROOM IS THE ROOM WE PLAN TO USE FOR SLS AND ORION.

248 00:12:52.679 --> 00:12:55.989 AND IT’S BEING MODIFIED TO SUPPORT EM-1.

249 00:12:55.990 --> 00:12:59.440 WE, IN FACT, ARE GOING TO USE THESE AFFECTS YOU SEE FOR FLIGHT

250 00:12:59.440 --> 00:13:02.750 FOLLOWING OF EFT-1.

251 00:13:02.750 --> 00:13:06.509 OUR TEAM WILL START ACTIVELY USING THESE ASSETS AND THESE

252 00:13:06.509 --> 00:13:10.069 CONSOLES WHEN ORION POWERS UP.
SO WE'LL GO THROUGH POWER-UP.

WE'LL GO THROUGH PROCESSING.

WE'RE GOING TO GO THROUGH THE LAUNCH.

WE'RE GOING TO GO THROUGH THE MISSION SEQUENCE AND LANDING AND RECOVERY AND GET DATA, VALUABLE DATA WE'LL USE TO ENHANCE AND HELP US LEARN WHEN WE BUILD THIS ROOM.

I THINK THAT COVERS KFC.

>> GREAT.

OKAY.

WE'LL TAKE A FEW QUESTIONS FROM REPORTERS.

AND IF YOU'LL STATE YOUR NAME AND AFFILIATION AT THE CENTRAL MIC HERE, WE'LL GO AHEAD.

>> JASON ROUND WITH AMERICASPACE.COM.
I actually have two questions. I'm not sure who to field them to.

The first goes to the fact that EFT-1 will be a flight test. You mentioned it will test the heat shield as well as parachutes.

What other systems that we used on the manned version of Orion will be test flight?

>> Great question.

Bascially it's a ring-out of the crew module system.

So all the entry navigation and guidance that we do, all the major avionics will be flying.

The boxes will be flying through a high radiation field, as well.
WE'RE TESTING THAT.

JUST TO GIVE YOU A SENSE FOR SOFTWARE, THE SOFTWARE TAKES --

WE'RE GOING TO THROUGH ABOUT HALF OF THE TOTAL SOFTWARE WE'RE FLYING IN MANNED FLIGHT.

IT GETS YOU A SENSE ABOUT HOW MANY FUNCTIONS WE'RE GOING TO BE CHECKING OUT.

BUT ALL THE -- ALL THE GUIDANCE THAT HAS TO DO ON ASCENT, SO

WE'RE GOING TO SEPARATE THE LAS, THE BEARINGS, THE BIG COVER WHEN WE ENTER.

THEN IT'S ALL THE PARACHUTES, ALL THE GUIDANCE, AND THEN ALL THE WAY DOWN TO THE LANDING.

SO THE ONLY THING THAT WE'RE NOT WRINGING OUT IN THIS FLIGHT IS

-- IN THE CREW MODEL IS GOING TO
BE THE LIFE SUPPORT SYSTEM.

THE PUMPS, PANS, SEATS, THAT KIND OF STUFF.

>> MY SECOND QUESTION I THINK IS ON THE MINDS OF A LOT OF AMERICANS THESE DAYS.

YOU KNOW, FRIDAY'S SEQUESTRATION.

AND WE'VE HEARD THAT WHILE ORION AND SLS WILL PRETTY MUCH NOT BE TOUCHED, WE'VE HEARD THAT ELEMENTS LIKE THE PLANETARY BUDGET AND THE COMMERCIAL SIDE OF THE HOUSE MIGHT BE IMPACTED.

WILL SEQUESTRATION HAVE ANY IMPACT ON WHAT'S GOING ON WITH ORION OR SLS THAT YOU'RE AWARE?

>> SEQUESTRATION AS FAR AS IT AFFECTS SLS AND ORION WILL NOT AFFECT IT IMMEDIATELY.

WE ARE WORKING TO THE SCHEDULE.
SEQUESTRATION AS WE CURRENTLY UNDERSTAND IT WILL AFFECT THE NASA BUDGET TO THE TUNE OF ABOUT A 5% HIT.

AND WE WORKED VERY HARD TO WORK THAT INTO THE PROGRAMS, PLAN FOR IT, PREPARE FOR IT.

THERE WILL BE SOME IMPACTS, AS YOU MENTIONED, ACROSS -- ACROSS THE AGENCY.

BUT FOR SLS AND ORION, WE'RE WORKING TO HOLD SCHEDULE AT LEAST FOR THE NEAR TERM AND MINIMIZE THOSE IMPACTS.

>> KEN KRAMER FOR "SPACEFLIGHT" MAGAZINE.

I HAVE A QUESTION ABOUT EM-1.

WHICH CAN WE EXPECT TO SEE THE VARIOUS STAGES ARRIVE HERE?

AND WHEN WOULD IT BE FULLY STACKED?
>> IT SOUNDS LIKE I LOST MY MIC.

OUR PLAN IS TO START PROCESSING IN THE 2016 TIME FRAME.

SO HARDWARE ARRIVES BEFORE THAT IN DIFFERENT INCREMENTS.

MOST OF TODD'S HARDWARE WILL BE IN THE DIRECT PATH.

AND I'LL CALL IT SHIP AND SHOOT OR SHIP AND STACK IS PROBABLY MORE APPROPRIATE.

MARK GEYER'S HARDWARE, ACTUALLY THE FIRST ORION SPACECRAFT THAT WE'LL LAUNCH ON EM-1 WILL BE SEVERAL MONTHS BEFORE THAT.

SO IT'S ROUGHLY THE 2015 TIME FRAME IS WHEN WE'LL SEE HARDWARE.

KFC.

>> CAN YOU TELL US IT THE WORK THAT'S GOING TO BE DONE ON ORION UNTIL THE END OF THIS YEAR?
THANKS.

>> GREAT.

ALREADY ALL THE PRIMARY STRUCTURE IS HERE WHICH IS

BASICALLY A THING THAT HOLDS PRESSURE, THE BIG GREEN THING

YOU MIGHT HAVE SEEN.

NOW WE'RE OUTFITTING ALL THE SECONDARY STRUCTURE WHICH WE

HANG THE HEAT SHIELD ON AND THEN WE INSTALL THE TUBING FOR THE

PROPULSION SYSTEM.

THAT'S -- THE TUBES ARE STARTING TO SHOW UP, AND WE'RE STARTING TO WELD THOSE IN.

WE'RE ACTUALLY BUILDING THE HARNESSES IN THE ONC, AS WELL.

WHAT WE'RE DOING THIS YEAR IS DO THAT FINAL OUTFITTING.
PUTTING THE THRUSTERS ON, TUBING ON, WELDING IT, LAYING OUT THE HARNESSES.

IN THE JULY TIME FRAME, ALL THE COMPUTERS WILL HAVE SHOWN UP, AND WE'LL DO THE FIRST POWER-ON OF THE FLIGHT ARTICLE.

SO THAT'S WHAT -- THOSE ARE THE BIG MILESTONES HERE AT KFC.

AT THE SAME TIME, WE'LL BE FINISHING THE OUTFIT OF THE SERVICE MODULE AND BRINGING THE BIG FAIRINGS IN.

LATER THIS YEAR, EARLY NEXT YEAR WE'LL DO THE STACKING OF THE CREW MODULE AND SERVICE MODULE AND FINISH THE LAST.

IN DENVER, THOUGH, JUST TO LET YOU KNOW, OUR AVIONICS LABORATORY IS IN DENVER.

WE ALREADY HAVE ALL THE ENGINEERING UNITS OF THE
COMMUTERS AND POWER DISTRIBUTION
UNITS AND BATTERIES AND GUIDANCE

AND THE COM SYSTEM.

ALL THE ENGINEERING UNITS ARE
LAID OUT IN DENVER IN A

LABORATORY.

WE'VE MADE OUR FIRST RUN OF THE
SOFTWARE THAT'S GOING TO

ACTUALLY TURN THE VEHICLE ON.

WE'RE STARTING TO GO THROUGH THE
FUNCTIONAL CHECKS IN DENVER NOW.

SO THERE'S A TON GOING ON RIGHT
NOW.

YEAH.

>> TODD HALVERSON, "FLORIDA
TODAY" FOR MARK GEYER.

COULD YOU TALK ABOUT HOW EFT-1,
THE DATA FROM THAT FLIGHT, IS

GOING TO INFORM THE DESIGN WORK
YOU'RE DOING ON THE VEHICLE AND

YOU'RE DOING ON THE VEHICLE AND
WHETHER, YOU KNOW, CHANGES MIGHT BE MADE BECAUSE OF THE DATA YOU GET BACK?

>> GREAT QUESTION.

SO I MENTIONED WE HAVE A HEAT SHIELD DESIGN TODAY, AND I'LL GIVE YOU AN EXAMPLE, WE HAVE A THICKNESS OF THE ABLATOR MATERIAL, STUFF THAT BURNS OFF WHEN YOU ENTER.

THAT'S BASED ON MODELS -- OF COURSE WE STARTED WITH "APOLLO."

WE HAVE ART KIT CHAMBERS HERE AT JCS AND NAIMS CALIFORNIA WHERE WE CAN TEST PIECES, SEE HOW MUCH THEY AVOID.

UNTIL YOU ACTUALLY PUT IT INTO A SPACECRAFT AND UNTIL YOU ACTUALLY FLY THE PROFILE, YOU'RE GOING TO FLY, RIGHT, ALL BASED ON MILES -- YOU WANT TO MAKE SURE YOU'VE FLOWN THAT IN AN
ENVIRONMENT BEFORE YOU PUT ANYBODY ON BOARD.

WE HAVE A LOT OF INSTRUMENTATION, LIKE I SAID.

WE'RE ACTUALLY GOING TO MEASURE THE PLASMA, THE TEMPERATURE AND OTHER PROPERTY WHICH WE'VE NEVER MEASURED BEFORE IN ONE OF THESE FLIGHTS.

SO THAT ALSO HELPS OUR GROUND BASE MODELS.

THAT'S THE KIND OF EXAMPLE OF HOW WE MAKE SURE THAT WE GET THE BEST HEAT SHIELD.

REMEMBER, MASS IS VERY PRECIOUS ON THIS VEHICLE.

WE DON'T WANT TO HAVE A WHOLE BUNCH OF HEAT SHIELD THICKNESS THAT WE DON'T NEED.

IT'S PART OF REALLY OPTIMIZING THE DESIGN SO WE CAN DO MORE IN
THE MISSION AND STILL HAVE A SAFE SPACECRAFT.

THERE'S ALL SORTS OF LOADS, AS WELL, RIGHT?

WE HAVE MODELS THAT TELL US WHAT THE METAL IS GOING TO SEE DURING LIFTOFF.

WE HAVE MODELS, WHAT WE EXPECT THE METAL TO SEE IN ENTRY AND WHEN IT HITS THE WATER.

WE'RE GOING TO INSTRUMENT ALL THOSE KEY PARTS OF THE STRUCTURE AND MEASURE ALL THAT DATA WHEN WE'RE ACTUALLY PERFORMING THE FLIGHT.

SO THAT'S ANOTHER TO SAY IS THE STRUCTURE TOO STRONG, YOU KNOW,

DID WE OVERDO IT BECAUSE WE'LL NEED THAT MASS, OR ARE WE FINDING AREAS IN THE VEHICLE WHERE WE THINK IT'S PROBABLY TOO
CLOSE TO THE MARGIN.

THIS REALLY GIVES US A CHANCE TO TWEAK I WOULD SAY, TO OPTIMIZE THE DESIGN BEFORE WE ACTUALLY PUT ANYBODY IN IT.

SO THOSE ARE TWO BIG EXAMPLES.

AND HOW IMPORTANT IS IT TO GET THAT DATA EARLY ON IN THE DESIGN PHASE?

>> AND YES.

SO IT'S HUGE.

LATER ON, THE MORE EXPENSIVE IT GETS, RIGHT?

THE LATER ON WE MAKE CHANGES AND ESPECIALLY IF WE'RE MAKING CHANGES IN THE ROCKETS WAITING FOR US, SAY WE FOUND SOME PROBLEM AND THEY'RE READY TO GO AND WE'RE NOT READY AND EVERYBODY'S WAITING ON US.
THAT'S WHY EFT-1 IS REALLY IMPORTANT FOR US TO GET HIGH-RISK AREAS TESTED SO IF WE FIND PROBLEMS WE CAN FIX THEM WHILE THEY'RE STILL IN DEVELOPMENT.

SO IT'S REALLY, REALLY IMPORTANT.

>> AND JUST ONE LAST ONE FROM ME.

TODD, GO AHEAD.

>> I WAS GOING TO ADD THAT -- I WAS GOING TO ADD THAT FOR THE SAME REASONS MARK TAKES THAT SAME DATA AND PUTS IT BACK INTO MS.

MODELS WE HAVE INTEGRATED STACK MODELS THAT WE'RE LOOKING AT ON THE LAUNCH VEHICLE ITSELF.

AS YOU SAID, YOU CAN DO CERTAIN THINGS WITH WIND TUNNELS AND
THINGS LIKE THAT TO GET BUFFETT LOADS AND ENVIRONMENTAL LOADS AND ARROW LOAD AND THINGS LIKE THAT.

GETTING THIS DATA BACK ACTUALLY HELPS US VALIDATE THOSE MODELS IN A WAY THAT ADDS ROBUST NOT. AND IF WE HAVE TO TWEAK THE MODELS, WE CAN DO THAT.

>> BEFORE YOU GO, TODD, JUST SO YOU UNDERSTAND THE SYSTEM, AS THESE GUYS MAKE TRADES AND ADJUSTMENTS AND CHANGES TO THEIR DEVELOPMENT ON THEIR PARTICULAR VEHICLES, IT TRANSLATES TO WHAT SERVICES WE PROVIDE AND WHAT CAPABILITIES WE PROVIDE ON THE GROUND.

SO AS THEY MATURE AND AS THEY LEARN THEIR LESSONS AND MAKE CHANGES EARLY, THE EASIER IT IS
FOR US ON THE GROUND TO BE ABLE

00:21:48,269 --> 00:21:50,460
TO REACT AND BE READY WHEN
THEY'RE READY.

00:21:50,460 --> 00:21:53,829
>> AND JUST ONE LAST ONE FOR
MARK.

00:21:53,829 --> 00:21:57,250
COULD YOU TALK ABOUT THE
POWER-UP IN JUBAI, I GUESS YOU

00:21:57,250 --> 00:22:02,170
SAID, AND HOW BIG A DEAL THAT IS
GOING TO BE GIVEN THE FACT WE

00:22:02,170 --> 00:22:05,100
HAVEN'T HAD A POWER-ON SINCE
LAST YEAR.

00:22:05,099 --> 00:22:06,099
>> YEAH.

00:22:06,099 --> 00:22:11,339
SO -- WELL, IT'S REALLY EXCITING
AND NOT JUST TO COMPUTER NERDS.

00:22:11,339 --> 00:22:14,230
YOU THINK OF THIS HUNDREDS OF
CHANNELS THAT HAVE TO TALK TO

00:22:14,230 --> 00:22:15,230
ONE ANOTHER.

00:22:15,230 --> 00:22:18,009
WE GET A LOT OF DATA FROM THE
GUIDANCE SYSTEM THAT THE

00:22:18,009 --> 00:22:20,759
COMPUTER HAS TO REACT TO.
AND THEN WE'RE ALSO MEASURING,
WE HAVE THOUSANDS OF PARAMETERS
THAT WE'RE ACTUALLY MEASURING

DURING THIS FLIGHT.

SO THE POWER-ON ALLOWS US TO
TURN THE COMPUTERS ON AND MAKE
SURE THAT THEY'RE TALKING TO ONE
ANOTHER.

AND THEY'RE GETTING THE DATA
THAT WE HAVE NO TIMING ISSUES.

AND THE UPDATE WE'LL HAVE TO MAKE
SURE ARE WORKING WELL.

AND THAT -- AND THAT THE TIMING
IS EXACTLY WHAT WE EXPECT.

AGAIN, WE WILL HAVE RUN ALL THAT
AND THE PROCEDURES OUT IN

DENVER, BUT WHAT WE FIND IS WHEN
YOU ACTUALLY STICK SOMETHING IN

A SPACECRAFT AND YOU HAVE THE
ACTUAL FLIGHT CABLES, SOMETIMES

YOU'LL FIND SURPRISES.
SO THAT'S WHY WE DO THE REAL POWER ON HERE IN JULY.

THAT'S A HUGE TEST FROM US.

WE HAVE A QUESTION FROM TWITTER FROM JIMMY LYNN WHO ASKS

-- HOW MANY ORION CAPSULES ARE PLANNED TO BE MADE?

NOW, YOU KNOW, IN 2021.

SO TODAY WE'RE ALSO TRYING TO BE VERY AFFORDABLE, COST CONSCIOUS.

SO THE CAPSULE WE'RE GOING TO FLY ON EFT-1, WE'RE GOING TO FLY

AGAIN ON A FLIGHT THAT WE CALL ASEN ABORT TWO.

THAT'S A TEST OF THE LAUNCH ABORT SYSTEM.

AND PUTS IT IN ITS MOST
STRESSING ENVIRONMENT WHICH IS THE MAX DYNAMIC PRESSURE.

00:23:37,769 --> 00:23:40,299
WE'RE GOING TO LAUNCH THAT OUT AT THE CAPE, AS WELL, ON A SMALL BOOSTER.

00:23:40,299 --> 00:23:41,299
WE'RE GOING TO REUSE THAT FOR THAT IMPORTANT TEST.

00:23:43,308 --> 00:23:47,330
EM-1, THE FLIGHT WE TALKED ABOUT IN 2017, THAT WILL BE A PLATE

00:23:47,330 --> 00:23:48,330
CAPSULE.

00:23:48,330 --> 00:23:51,919
WE'LL FLY -- FLIGHT CAPSULE.

00:23:49,330 --> 00:23:51,919
WE'LL FLY THAT, THAT'S THE NEXT IN 2017.

00:23:51,920 --> 00:23:53,990
WE'LL REUSE THAT, AS WELL.

00:23:53,990 --> 00:23:57,819
WHEN IT COMES BACK, WE'LL TAKE IT TO OHIO AND DO THE ABORT QUALIFICATION.

00:23:57,819 --> 00:23:58,819
WE'LL TAKE IT UP TO ABORT LOADS AFTER WE'VE FLOWN IT ON EM-1.

00:24:01,680 --> 00:24:03,549
AND THEN WE BUILD A CAPSULE FOR EM-2.
YOU THINK ABOUT THE GROUND TEST CAPSULE, THERE'S FOUR AND WE'LL REUSE THOSE AS MUCH AS WE CAN.

>> WE HAVE ANOTHER QUESTION FROM TWITTER FROM STEVEN ANDERSON WHO ASKS - WHEN ARE WE GOING TO SEND PERSONNEL BACK TO THE MOON?

>> WELL, WHETHER DO WE GO BACK TO THE MOON IS STILL -- WHEN DO WE GO BACK TO THE MOON IS STILL UNDER STUDY.

WE KNOW WE'RE EVENTUALLY GOING TO MARS.

AND THERE ARE MULTIPLE DESTINATIONS BETWEEN HERE AND MARS, AND WE'RE SORTING THROUGH WHAT IS THE BEST OR -- THE BEST WAY TO APPROACH THIS EXPLORATION, HOW CAN WE LEARN, WHAT DO WE NEED TO LEARN ON OUR WAY TO MARS, AND HOW BEST CAN WE
LEARN IT.
AND SO THE MOON IS ONE OF THOSE

00:24:50,789 --> 00:24:52,629
DESTINATIONS POSSIBLY.

00:24:52,630 --> 00:24:56,200
ASTEROIDS ARE ANOTHER POSSIBLE DESTINATION.

00:24:56,200 --> 00:25:00,009
EXPLORATION MISSION ONE THAT WE'VE TALKED ABOUT IN 2017 AND

00:25:00,009 --> 00:25:05,349
ALSO OUR FIRST CRUDE FLIGHT ARE CURRENTLY PLANNED TO GO TO LUNAR

00:25:05,349 --> 00:25:06,349
SPACE.

00:25:06,349 --> 00:25:08,149
WE'RE GOING TO THE LUNAR -- THE VICINITIES OF THE MOON.

00:25:08,150 --> 00:25:10,980
WE ARE NOT GOING TO GO ALL THE WAY AND LAND ON THE MOON BECAUSE

00:25:10,980 --> 00:25:12,799
WE WON'T HAVE THAT CAPABILITY.

00:25:12,799 --> 00:25:17,250
BUT WE WILL BE GOING TO THE AREA AROUND THE MOON PRIMARILY TO

00:25:17,250 --> 00:25:22,420
LEARN WHAT WE NEED TO KNOW OUR WAY TO MARS AND ALSO TO TEST OUT

00:25:22,420 --> 00:25:26,480
OUR SYSTEMS, TO TEST OUT THE SPACE LAUNCH SYSTEM AND ORION IN

00:25:26,480 --> 00:25:30,759
THEIR ENVIRONMENTS SO WE CAN PREPARE OURSELVES FOR THE LONGER TRIPS OUT TO MARS.

THIS PROBABLY FEEDS RIGHT INTO THAT FROM TWITTER, AS WELL, FROM STONE SASBO.

IT SAYS -- WHAT ARE THE CURRENT MAIN GOALS OF DEEP SPACE EXPLORATION AND WHEN ARE WE HOPING TO DISCOVER?

THE CURRENT MAIN GOAL IS RIGHT THERE IN THE WORD.

IT'S EXPLORATION.

IT'S TO EXPLORE THE UNKNOWN, TO LEARN WHAT WE CAN FROM THE UNKNOWN, AND TO BE ABLE TO GET HUMANS OUT THERE WITH THE SPECIAL EXPERTISE AND THE SPECIAL ABILITY THAT THE HUMAN MIND HAS TO BE ABLE TO LOOK AT A GIVEN SITUATION AND FIGURE OUT
WHAT WE CAN LEARN ABOUT OUR
UNIVERSE, WHAT CAN WE LEARN FROM

00:26:12,930 --> 00:26:16,210
THAT EXPLORATION THAT CAN --
THAT CAN FEED BACK INTO WHAT WE

00:26:16,210 --> 00:26:20,390
WANT TO KNOW BETTER ABOUT HOW TO
LIVE AND WORK ON EARTH.

00:26:20,390 --> 00:26:24,320
AND HOW TO MAKE OUR LIVES ALL
BETTER BASED ON WHAT WE LEARN IN

00:26:24,319 --> 00:26:27,720
THE SCIENCES AND WHAT WE LEARNED
FROM THAT EXPLORATION.

00:26:27,720 --> 00:26:30,589
WE LEARNED A VAST AMOUNT FROM
THE MOON.

00:26:30,589 --> 00:26:34,109
WE WENT TO THE -- FUNDAMENTALLY
WE WENT TO THE EQUATOR OF THE

00:26:34,109 --> 00:26:35,109
MOON.

00:26:35,109 --> 00:26:37,069
THERE'S LOTS MORE TO LEARN
THERE.

00:26:37,069 --> 00:26:40,779
OBVIOUSLY LEARNING MORE FROM
ASTEROIDS AND EVENTUALLY ALL THE

00:26:40,779 --> 00:26:45,099
LESSONS WE'RE LEARNING FROM
"CURIOSITY" AND THE MARS ROVERS

00:26:45,099 --> 00:26:49,599
AND GETTING THAT HUMAN MIND
THERE IN ADDITION TO THE ROBOTS
IS WHAT WE'RE AFTER.

WE THINK WE CAN LEARN AN AWFUL LOT FROM THAT.

WHAT WE WILL LEARN, IT'S HARD TO PREDICT.

EXPLORATION NECESSARILY IS EXPLORING THE UNKNOWN.

BUT WE'RE GOING THERE TO LEARN.

THE EXPLORATION WHICH I THINK A LOT OF US AS KIDS, THAT'S WHERE

WE'RE IN THIS BUSINESS.

I THINK THERE'S ANOTHER IMPORTANT PART ABOUT IT, TOO, AS

WELL AS -- AS FAR AS NATIONAL LEADERSHIP, AS FAR AS AMERICA

BEING A LEADER IN THE WORLD.

YOU CAN SEE -- YOU CAN SEE THAT IN OTHER COUNTRIES TRYING TO
ACCOMPLISH THINGS THAT WE HAVE ALREADY DONE -- AND I THINK IT'S IMPORTANT FOR THE UNITED STATES TO CONTINUE TO BE A LEADER.

IT'S OKAY TO LEAD OTHER COUNTRIES.

IT'S LIKE WE'RE ADDING TO THIS THING.

BUT TO BE THE LEADER, I THINK THAT'S IMPORTANT FOR NATIONAL PRESTIGE AND LEADERSHIP.

>> JASON RYAN FROM AMERICASPACE.COM AGAIN.

WE MENTIONED MARS.

WE KNOW THAT ORION IS A LARGER KIND OF VERSION OF AN "APOLLO" SPACECRAFT.

THERE'S BEEN SOME STUDIES THAT SHOW THIS A SPACECRAFT THAT WOULD TAKE A CREW TO MARS WOULD HAVE TO BE THE SIZE OF PERHAPS
LARGER THAN THE INTERNATIONAL SPACE STATION.


WHEN IT COMES TO MARS, WHAT ARE YOU GUYS LOOKING AT?

WHAT TYPE OF CRAFT ARE YOU JUST, YOU KNOW, PENCILLING IN NOW OR CONSIDERING?

CAN YOU GIVE US SOME BROAD STROKES ON THAT?

>> I CAN GIVE YOU THE BROAD STROKES.

AND WE START AT MARS AND WHAT WOULD A MARS MISSION LOOK LIKE

AND THEN WHAT DO WE NEED TO LEARN AND DEVELOP AND

CAPABILITIES DO WE NEED TO BE ABLE TO EXECUTE THAT MISSION.

AND WE WORK OUR WAY BACKWARDS.
WE'VE WORKED OUR WAY BACKWARDS TO THE FACT THAT WE KNOW WE NEED AN ORION SPACECRAFT TO GET THE CREW UP TO SPACE AND TO BRING THEM HOME SAFELY.

WE KNOW THIS WE NEED A LARGE LAUNCH VEHICLE TO GET ALL THE PAYLOAD UP TO ORBIT AND INTO SPACE.

AND WE KNOW THAT WE WILL HAVE TO DEVELOP OTHER HABITATS, OTHER CAPABILITIES THAT ARE NEEDED TO EXECUTE A MARS MISSION.

NOW WHAT THOSE HABITATS, THOSE OTHER CRAFTS LOOK LIKE RIGHT NOW, WE DON'T KNOW.

WE'RE STUDYING ALL THE OPTIONS.

BUT WE'RE ALSO RUNNING EXPERIMENTS ON THE INTERNATIONAL SPACE STATION SUCH AS THE BIGELOW BEAM EXPERIMENT WITH AN
INFLATABLE STRUCTURE THAT'S COMING UP.

HOPEFULLY A TWO-YEAR EXPERIMENT ON SPACE STATION TO HELP US LEARN AND TO HELP US DESIGN WHAT THOSE FUTURE CRAFTS TO MARS WILL BE.

>> KEN KRAMER, "UNIVERSE TODAY" FOR MARK GEYER.

CAN YOU TALK IN DETAIL ABOUT THE ASCENT ABOoard TEST.

WHEN'S IT GOING TO BE, WHERE'S THE ROCKET, WHEN IS IT GOING TO LAUNCH?

WILL YOU BUILD A NEW -- TALK IN SOME DETAIL ABOUT THAT, PLEASE.

AGAIN, ASSENTS BOARD TWO IS REALLY TO TEST THE LAUNCH BOARD

ABORT SYSTEM.

YOU'RE TRYING TO LAUNCH THE ABORT ENVIRONMENT.
YOU WOULDN'T WANT IT ON A REAL ROCKET BECAUSE YOU WOULD HAVE TO BLOW UP THE ROCKET TO GET IN THE RIGHT ENVIRONMENT.

WE'LL REUSE A PEACEKEEPER STAGE THAT WE HAVE A DEAL WITH THE AIR FORCE THAT WE GET.

WE'LL BALLAST IT SO WE GET THE RIGHT ENVIRONMENT.

WE'LL LAUNCH IT RIGHT HERE IN FLORIDA.

I CAN'T REMEMBER THE NAME OF THE LAUNCHPAD.

WE'RE REFURBING THAT. IT'S SMALLER.

IT WILL HAVE THE BOOSTER FROM THE AIR FORCE.

WE'LL HAVE A CREW MODULE AND THE
LAUNCH ABORT.

604 00:30:15,109 --> 00:30:16,609
YOU SAW THE ABORT MOTOR TODAY.

605 00:30:16,609 --> 00:30:21,209
BUT THERE'S ALSO A CONTROL
MOTOR, JETTISON MOTOR AND THE

606 00:30:21,210 --> 00:30:24,179
FARINGS.

607 00:30:24,179 --> 00:30:28,191
BASICALLY THE BOOSTER WILL GET
US FAST UP TO MAX X, THEN WE

608 00:30:28,191 --> 00:30:29,250
LIGHT THE ABORT.

609 00:30:29,250 --> 00:30:30,480
THEN WE'LL DO THE ABORT.

610 00:30:30,480 --> 00:30:33,670
WE'LL CONTROL THE ALTITUDE WITH
THE ACM AND DO THE SEPARATION

611 00:30:33,670 --> 00:30:34,720
AND ALL THE PARACHUTE TESTS.

612 00:30:34,720 --> 00:30:38,640
IF YOU THINK ABOUT THE ONE TEST
THAT WE DID A FEW YEARS AGO,

613 00:30:38,640 --> 00:30:42,780
IT'S BASICALLY EXERCISING THAT
SAME INTEGRATED SYSTEM BUT IN A

614 00:30:42,779 --> 00:30:47,579
MUCH MORE STRESSING AERODYNAMIC
ENVIRONMENT.

615 00:30:47,579 --> 00:30:50,829
SO IT WILL HAVE ALL THREE BIG,
SOLID ROCKET MOTORS.
EFT-1, THE ONLY ACTIVE SOLID ROCK MOTOR IS A JETTISON MOTOR.

WE'RE GOING TO SIMULATE A NOMINAL JETTISON OF THE LAST TOWER.

WE'RE NOT PUTTING AN ACTIVE ABORT MOTOR OR ACTIVE ACH BECAUSE YOU'D BE WASTING MONEY, THROWING IT AWAY.

>> CAN YOU TALK ALSO ABOUT THE SERVICE MODULE?

ESA'S GOING TO BUILD IT FOR THE EM-1 FLIGHT.

IT'S NOT CLEAR TO ME, THOUGH, IT EM MIGHT HAVE 2 AS -- EM-2.

AT THE BRIEFING YOU TALKED ABOUT USING PIECES.

I WONDER IF YOU COULD TALK IN DETAIL AND WOULD ESA BE INVOLVED IN FUTURE SERVICE MODELS BEYOND EM-1?

>> YEAH.
The current agreement is for the first one. We're working with them, and they're doing a design. NASA will own the intellectual property for that design. The second we have options. We can talk to ESA about some further deal downstream, if there were other things they wanted to barter and if the government felt that was the right thing to do. We could barter for another and get the second one or take the design and build our own. That's -- we have time to go figure that out. But we get one as part of the deal. So EM-1 will be an ESA-provided.
SERVICE MODULE.

00:32:02,388 --> 00:32:05,099
>> I'M GOING TO FOLLOW UP ON
KEN'S QUESTION THERE AND ASK,

00:32:05,099 --> 00:32:07,859
YOU WORKED WITH ESA ON THIS ONE.

00:32:07,859 --> 00:32:10,349
OF COURSE, THE BUDGET IS A BIG
CONCERN THESE DAYS.

00:32:10,349 --> 00:32:13,289
IS NASA LOOKING AT OTHER WAYS TO
PERHAPS SHARE THE LOAD SO TO

00:32:13,289 --> 00:32:15,440
SPEAK AND GAIN PARTNERS KIND OF
LIKE WHAT YOU'VE DONE IN THE

00:32:15,440 --> 00:32:20,579
INTERNATIONAL SPACE STATION?

00:32:20,579 --> 00:32:23,159
>> SO FOR ORION, THE SERVICE
MODULE IS THE EXTENT.

00:32:23,159 --> 00:32:26,039
WE HAVE THE DESIGN AND PIECES
FOR EVERYTHING ELSE.

00:32:26,039 --> 00:32:29,289
I KNOW DAN AND BILL ARE THINKING
ABOUT --

00:32:29,289 --> 00:32:33,928
>> THE ANSWER TO YOUR QUESTION
IS, YES, WE ARE LOOKING FOR
POSSIBLE PARTNERSHIPS AND TRYING TO SORT THROUGH THE VARIOUS DESIRES OF ALL THE INTERNATIONAL PARTNERS.

WE HAVE STUDIES ONGOING IN THAT AREA.

AND WE'RE LOOKING AT ALL LEVELS OF PARTNERSHIP.

IT'S VERY CLEAR TO US THAT THE INTERNATIONAL PARTNERSHIP AS DEMONSTRATED BY THE INTERNATIONAL SPACE STATION IS A KEY INGREDIENT TO A LONG-TERM SUSTAINABLE PROGRAM.

WE ARE LOOKING FOR THOSE OPPORTUNITIES.

WE ARE WORKING WITH THE EUROPEAN SPACE AGENCY, WITH THE JAPANESE SPACE AGENCY, WITH THE RUSSIANS.

WE'RE WORKING WITH ALL OF OUR INTERNATIONAL PARTNERS FOR THOSE OPPORTUNITIES.
WE HAVE NOTHING YET THAT'S SOLIDIFIED AS WHAT WE HAVE WITH THE ORION SERVICE MODULE.

BUT WE'RE LOOKING FOR THE OPPORTUNITIES.

>> OKAY.

THANKS FOR JOINING US TODAY TO LEARN MORE ABOUT NASA'S HUMAN EXPLORATION PROGRAMS.

VISIT WWW.NASA.GOV/EXPLORATION, AND WE'LL CONCLUDE WITH A VIDEO THAT SHOWS PROGRESS THAT WE'RE MAKING TOWARD EFT-1.

THEN THEY WERE FORMED -- IT WAS A BUMP, A PROCESS CALLED BUMP FORMING.

YOU MAKE THEM INTO THE SHAPE THAT WE NEED HERE, AND WE WELD THREE OF THESE SEGMENTS TOGETHER TO FORM THE CONE THAT YOU SEE.
BEHIND YOU.

00:34:14,509 --> 00:34:19,639
\M\M
>> WE JUST DELIVERED THE FIRST

00:34:19,639 --> 00:34:28,079
CREW MODULE TO KFC.

00:34:28,079 --> 00:34:47,319
IT STARTED A LOT OF THE PARTS --
TO THE OUTSIDE OF THE CM, AND

00:34:47,320 --> 00:34:52,530
WE'VE ACTUAL PUT IT IN WHAT WE
CALL THE BIRD CAGE SO WE CAN

00:34:52,530 --> 00:35:00,608
LOCATE ALL THOSE PARTS, YOU
KNOW, WITHIN THOUSANDS OF AN

00:35:00,608 --> 00:35:03,730
INCH TO MAKE SURE THAT
EVERYTHING IS GOING TOGETHER

00:35:03,730 --> 00:35:10,690
>> PUTTING WIRING INSIDE,
PUTTING TUBES FOR THE -- YOU

00:35:10,690 --> 00:35:16,548
KNOW, FOR THE PROPULSION SYSTEM,
PUTTING VALVES AND PUMPS AND SO

00:35:16,548 --> 00:35:21,099
ALL OF THAT HAPPENS IN STAGES
RIGHT THERE IN THE ONC BUILDING.

00:35:21,099 --> 00:35:22,099
>> WE HAVE A CONTRACT WITH USA,
SPACE LINE, TO BUILD OUR
HARNESSES.

00:35:22,099 --> 00:35:30,619
THEY'RE SET UP IN THE ONC AND SO THEIR LITTLE SHOP DELIVERS TO

00:35:30,619 --> 00:35:41,199
THE BIG SHOP.

00:35:41,199 --> 00:35:59,039
>> THERMAL PROTECTION IS VERY DIFFICULT AS REENTRY VEHICLES TO

00:35:59,039 --> 00:36:14,289
TEST AND MODEL.

00:36:14,289 --> 00:37:21,190
REALY YOU HAVE IT FLY IT TO REALLY UNDERSTAND WHAT'S GOING

00:37:21,190 --> 00:37:41,200
TO HAPPEN.

00:37:41,199 --> 00:38:44,929
WE'RE BUILDING CERAMIC THERMAL INSULATION TILES FOR THE BACK OF

00:38:44,929 --> 00:39:05,919
THE CAPSULE.

00:39:05,920 --> 00:39:17,679
WE'RE BUILDING THERMAL TILES FOR THE CAPSULE AND BUILDING

00:39:17,679 --> 00:39:22,358
MULTILAYER INSULATION FOR THAT CAPSULE.

00:39:22,358 --> 00:39:24,048
>> I'M HEAT SHIELD DESIGN LEAD.

00:39:22,358 --> 00:39:40,048
WE'RE BUILDING FOR THE FUTURE ORION.
THE HEAT SHIELD IS IN THE 20 BY 25 ROUTER.

A FIVE-ACCESS ROUTER.

RIGHT NOW IT'S MACHINING THE INTERIOR BOWL IF YOU WILL OF THE HEAT SHIELD.

COULD TAKE WEEKS OF MACHINE TIME RUNNING MULTIPLE SHIFTS.

IT'S THE BIGGEST HEAT SHIELD EVER CONSTRUCTED.

THE COMPONENT IS THE HEAT SHELLED SKELETON.

THE BACK ITS-- THE BACKBONE OF THE STRUCTURE ITSELF.

THE OTHER UNIQUE THING IS THE HAND DRILLING.

IT'S NOT AUTOMATED BY A ROUTER.

IT HAS TO BE HAND DRILLED BY TECHNICIANS ON THE INSIDE.
200-PLUS TITANIUM PARTS ALL MCHED TOGETHER.

WE HAVE -- MATCHED TOGETHER.

WE HAVE A TOOL THAT PUTS PIECES IN THE RIGHT SPOT.

THEN WE DRILL AND LOCK THEM ALL TOGETHER.

MCC IS TRANSFORMING FROM SUPPORTING SPACE SHUTTLE AND SPACE STATION TO A PLATFORM THAT WILL SUPPORT SPACE STATION AND MPT OR ORION.

IN THE FUTURE WE NEED TO GO TO A MORE MODERN SYSTEM.

KFC WILL OPERATE THE VEHICLE ALL THE WAY UP UNTIL LAUNCH.

WE'LL OPERATE THE VEHICLES UNTIL SPLASH DOWN UNTIL FORCES TAKE OVER AFTER THAT.

THIS IS THE LAUNCH CONTROLLER WE'LL USE FOR ORION SLS MISSION.
WE'VE BEEN WORKING WITH THE ORION PROGRAM TO GET THE SPACECRAFT DATA SO WE CAN PROCESS IT WITH OUR SOFTWARE IN THE FIRING ROOM.

WE WILL BE FLIGHT SELLING THAT MISSION OUT OF IR-1.

WE REFITTED THE ROOM, REDID IT, PUTTING THE SOUND DEPRESSION CARPETING ON THE WALLS, MAKING IT A MORE COMFORTABLE PLACE TO WORK.

SO WE'RE AIMING FOR ABOUT 50 PEOPLE IN FIRE ROOM ONE, FOR AN EM-1 MISSION.

WE ARE ACTUALLY USING FIRE ROOM NOW TO TEST PAD B SUBSYSTEMS.

THIS IS GOING TO BE ALMOST LIKE A COMPLETE NEW PAD BECAUSE WE WILL HAVE REFURBISHED EACH AND EVERY SYSTEM THAT IT'S
INSIDE OF.

WE'RE GOING TO HAVE THE VEHICLE LAUNCHED FROM THE MOBILE LAUNCHER AND NOT ONLY LAUNCH FROM THE MOBILE LAUNCHER BUT HAVE A TOWER THAT WILL HAVE ALL THE SERVICES ATTACHED TO THE VEHICLE.

THE TOWER IS GOING TO BE ON THE MOBILE LAUNCHER.

THE VEHICLE WILL BE ASSEMBLED AT THE VAB.

>> IT'S A RETURN TO A CONCEPT THAT WE KNEW THAT WORKED WELL DURING THE "APOLLO" YEARS WHEN THE MOBILE LAUNCH PLATFORM HAD A TOWER ON IT.

WE KNEW THAT THE BAB WAS DESIGNED TO ACCOMMODATE A LAUNCH TOWER ON A MOBILE LAUNCH PLATFORM.
WE HAVE TO MAKE SURE THAT THE --
BAB COULD REMAIN STAFFED AND
ACCOMMODATE DIFFERENT VEHICLE
ARCHITECTURES.

AND NOW WE HAVE A CLEAN VAB
SHELL, PER SE, ABOUT THE
INFRASTRUCTURE SO THAT WE CAN
ACCOMMODATE THE NEW HARDWARE,
THE NEW VEHICLE ACCESS WITH THE
NEW PLATFORMS.

AND THAT IS THE FIRST PHASE OF
WHAT WE'RE DOING NOW.

>> AND ONCE THE VEHICLE IS READY
WITH ALL THE CONNECTIONS, THE
ONLY THING WE'VE GOT TO DO IS
MOVE THE VEHICLE FROM THE BACK
TO THE CONNECTIONS ON THE MOBILE
LAUNCHER.

ONCE WE DO THOSE CONNECTION,
WE'RE READY TO LAUNCH.

>> THERE WAS A TIME WHEN I HAD
TO EXPLAIN WHAT A CRAWLER WAS.

IF YOU DIDN'T WORK OUT HERE AT
THE SPACE CENTER OR WEREN'T IN

00:43:09.838 --> 00:43:13.108
THE CENTRAL FLORIDA AREA, A LOT
OF PEOPLE -- SOMEHOW THE VEHICLE

00:43:13.108 --> 00:43:14.380
GOT UP TO THE PAD.

00:43:14.380 --> 00:43:18.180
WE KNEW WHAT TO EXPECT FROM A
LOAD PERSPECTIVE WITH THE NEW

00:43:18.179 --> 00:43:21.679
VEHICLE, THE LARGER ROCKET AND
THINGS ALONG THOSE LINES.

00:43:21.679 --> 00:43:23.798
THAT GOES FROM THE CRAWLER
LIFTED LOAD, THE HYDRAULICS,

00:43:23.798 --> 00:43:25.018
ALSO THE CRAWLER AWAY.

00:43:25.018 --> 00:43:27.798
WE'LL HAVE TO NATURE THE LOAD
AND -- THE CAPABILITY FOR THE

00:43:27.798 --> 00:43:29.759
CRAWLER AT THE ROCK.

00:43:29.760 --> 00:43:33.509
WHAT WE'VE ESSENTIALLY DONE IS
KEEP THE SAME HYDRAULICS ON SUCH

00:43:33.509 --> 00:43:37.130
AS INCREASING THE SIZE, DIAMETER
OF THE HYDRAULICS.

00:43:37.130 --> 00:43:39.940
LAST NOVEMBER WE ACTUALLY TOOK A
RIDE OUT WITH THE COMPLETED

00:43:39.940 --> 00:43:42.710
CRAWLER AFTER THE PAD AND TESTED
OUT THE SYSTEM.

00:43:42,710 --> 00:43:46,818
AND A COUPLE OF ITEMS,
EVERYTHING WORKED GREAT.

00:43:46,818 --> 00:43:49,409
THE CONTROL SYSTEM HAD BEEN
UPGRADED.

00:43:49,409 --> 00:43:53,068
THE DRIVER PAD HAD BEEN
REPLACED, BRAKES HAD BEEN

00:43:53,068 --> 00:43:54,068
REPLACED.

00:43:54,068 --> 00:43:57,048
NEARLY EVERY SUBSYSTEM HAD SOME
WORK DONE TO IT.

00:43:57,048 --> 00:44:01,318
THE TRACTION SUPPORT ELEMENTS,
EACH OF THE FOUR CORNERS HAD 22

00:44:01,318 --> 00:44:04,650
ROLLERS, ABOUT THE SIZE OF A CAR
TO BE HONEST WITH YOU.

00:44:04,650 --> 00:44:07,809
AND WE'RE CHANGING OUT ALL OF
THOSE AND LARGE NOTICES, AS

00:44:07,809 --> 00:44:08,909
WELL.

00:44:08,909 --> 00:44:12,538
>> WHAT I LOVE DOING IS
REMINDING THE OUTSIDE WORLD

00:44:12,539 --> 00:44:14,900
WHETHER IT'S WITHIN OUR
GOVERNMENT OR ESPECIALLY THE

00:44:14,900 --> 00:44:19,389
MEDIA HAS THAT HAS A PERCEPTION THAT WE'RE IN A LULL, THERE'S IN GOING ON.

THE SPACE PROGRAM SHUTTING DOWN.

TO SAY, NO, THIS IS THE FAR OPPOSITE FOR US.

WE ARE UTILIZING THIS INTERPROGRAM TIME FRAME TO MAKE ALL THE MODIFICATIONS AND ALL THE INFRASTRUCTURE CHANGES THAT WILL HELP BRING THAT AGENCY VISION INTO REALITY.

>> MANY OF US FEEL THE COUNTRY WANTS TO GO FORWARD, AND -- AND NASA HAS A BIG FOLLOWING.

EVERY TIME I TALK IT PEOPLE, THEY'RE EXCITED GOOD NASA.

>> ENABLING PEOPLE TO GO BEYOND WHERE THEY HAVE EVER GONE BEFORE

AND LOOK AND DISCOVER THINGS THAT THEY DIDN'T EVEN KNOW
EXISTED IS JUST -- IT'S JUST A REAL HONOR.

796
00:45:00,028 --> 00:45:02,460
>> IT'S BEEN A PLEASURE TO BE INVOLVED WITH THIS PROJECT, AND

797
00:45:02,460 --> 00:45:04,989
I CAN'T SAY ENOUGH FOR THE TEAM THAT PUT THIS TOGETHER.

798
00:45:04,989 --> 00:45:06,969
>> I'M PRIVILEGED TO WORK THIS PROGRAM.

799
00:45:06,969 --> 00:45:09,789
I THINK MOST PEOPLE WHO WORK IT TODAY FEEL THE SAME WAY.

800
00:45:09,789 --> 00:45:10,940
>> I CAN'T BELIEVE THEY PAY ME FOR THIS JOB.

801
00:45:10,940 --> 00:45:11,940
IT'S JUST WONDERFUL.

802
00:45:11,940 --> 00:45:12,940
GREAT.

803
00:45:12,940 --> 00:45:13,940
\M\M
>> THE SYSTEM IS THE NEXT,

804
00:45:13,940 --> 00:45:14,940
NEWWEST, BIGGEST ROCKET WE'RE GOING TO BUILD.

805
00:45:14,940 --> 00:45:15,940
AND IT'S NOT JUST A REPLACEMENT FOR THE SPACE SHUTTLE.

806
00:45:15,940 --> 00:45:16,940
THIS ROCKET IS GOING TO CARRY US MUCH FURTHER THAN THE SHUTTLE
WOULD GO.

IT'S NASA'S NEXT BIG ROCKET FOR DEEP SPACE EXPLORATION.

>> THE SLS IS A NATIONAL CAPABILITY THAT PROVIDES A UNIQUE ACCESS TO SPACE THAT AMERICA HAS NOT HAD IN 40 YEARS.

>> THE LARGE LAUNCHES REALLY OPENS THE DOOR TO DESTINATIONS BEYOND.

IT'S NOT LIMITED -- IT'S ONLY LIMITED BY IMAGINATION.

>> WHAT WE'RE FOCUSED ON HERE AT THE CENTER IS THE PROPULSION SYSTEM.

AND THAT CONSISTS OF TWO SOLID ROCKET BOOSTERS AND A CORE WITH SOME TANKS THAT FEED LIQUID ROCKET ENGINES IN THE MIDDLE.

THEN THE ASTRONAUTS SIT ON THE TOP.
IN THE ORION SPACECRAFT.

>> ONE OF THE THINGS WE RECOGNIZE FOR SLS IS WE HAVE TO BE AFFORDABLE.

SO WE HAD TO DO THINGS DIFFERENTLY, MORE EFFICIENTLY, AND SMARTER.

>> WE'RE ALL CONSCIOUS ABOUT SAVING MONEY, DOING IT MORE AFFORDABLY THAN WE HAVE IN THE PAST.

BUT AT THE SAME TIME WE CAN'T SACRIFICE RELIABLE OR SAFETY.

>> THE SYSTEM USES A SIGNIFICANT AMOUNT OF HERITAGE HARDWARE, WHICH IS THING THAT WE HAVE EVOLVED FROM THE SPACE SHUTTLE PROGRAM.

>> THE SPACE SHUTTLE HAS TWO CANDLE-LOOKING THINGS WHICH ARE
THE SOLID ROCKETS.

THOSE ARE KEPT AND THOSE ARE USED ON SLS.

>> WE'VE ADDED A SEGMENT TO THE FOUR-SEGMENT SOLID ROCKET BOOSTERS THAT WE HAD ON THE SHUTTLE.

THAT GIVES IT MORE POWER, MORE THRUST, AND IT HELPS THE LARGER ROCKET GET OFF THE GROUND.

WHAT THOSE BOOSTER ARE FOR IS JUST TO GET YOU GOING.

THEY BURN FOR A COUPLE OF MINUTES, THEN THEY FALL TO THE GROUND.

THEN YOUR LIQUID ENGINES, YOU'RE UP HIGH ENOUGH THAT IT CAN CARRY YOU AS HIGH AS YOU WANT TO GO.

IF YOU HAVE ADDITIONAL STAGES LIKE WE'RE GOING TO HAVE ONE,
YOU CAN GO FURTHER INTO THE SPACE.

844
00:45:53,940 --> 00:45:54,940
>> RIGHT NOW WE HAVE 14 INCHES ON THE SHUTTLE.

845
00:45:54,940 --> 00:45:55,940
-- 14 ENGINES ON THE SHUTTLE.

846
00:45:55,940 --> 00:45:56,940
ONE ENGINE THAT WAS ASSEMBLED AND NEEDS TESTING.

847
00:45:56,940 --> 00:45:57,940
WE LOOKED AT ALL OF IT AND DETERMINED WE COULD ASSEMBLE 16

848
00:45:57,940 --> 00:45:58,940
ENGINES THAT WE'LL BE ABLE TO USE.

849
00:45:58,940 --> 00:45:59,940
>> WE ARE MAKING TREMENDOUS PROGRESS.

850
00:45:59,940 --> 00:46:00,940
WE'VE GOT ALL OF OUR CONTRACTORS ON BOARD.

851
00:46:00,940 --> 00:46:01,940
WE'RE TESTING ENGINES, SOLID ROCKET BOOSTERS, AVIONICS

852
00:46:01,940 --> 00:46:02,940
SYSTEMS.

853
00:46:02,940 --> 00:46:03,940
>> IT'S SET A RECORD AT STENNIS.

854
00:46:03,940 --> 00:46:04,940
IN TESTING IT WAS THE FIRST OXYGEN ENGINE TO GET TO A FULL

855
00:46:04,940 --> 00:46:05,940
DURATION TEST IN FOUR TESTS.

00:46:05,940 --> 00:46:06,940
>> WE WERE DEVELOPING THIS BOOSTER UNDER THE AIRES PROGRAM,

00:46:06,940 --> 00:46:07,940
AND WE'RE MOVING THAT INTO THE SLS VEHICLE.

00:46:08,940 --> 00:46:09,940
THE MOTOR ITSELF HAS BEEN THROUGH THREE DEVELOPMENT

00:46:09,940 --> 00:46:10,940
FIRINGS WHICH ARE FULL-SCALE MOTORS TESTED OUT IN UTAH.

00:46:10,940 --> 00:46:11,940
AND WE'VE GOTTEN A LOT OF GOOD ENGINEERING DATA FROM THOSE

00:46:11,940 --> 00:46:12,940
TESTS.

00:46:12,940 --> 00:46:13,940
>> THIS GOES FROM BETWEEN THE BOTTOM OF THE ORION CAPSULE AND

00:46:13,940 --> 00:46:14,940
THE TOP OF THE ONE WE'RE DEVELOPING HERE AT MARSHALL.

00:46:14,940 --> 00:46:15,940
>> IT'S BEEN SPECIFICALLY DESIGNED TO GIVE STRENGTH TO THE

00:46:15,940 --> 00:46:16,940
ADAPTER SO THAT IT CAN TAKE THE LOAD IN FLIGHT AND STILL BE

00:46:16,940 --> 00:46:17,940
LIGHTWEIGHT.
THIS SHAPE STARTED OUT AS A SERIES OF FLAT PANELS.

THE PATTERN WAS MACHINED INTO THE SURFACES.

THEN THEY WERE FORMED IN A PROCESS CALLED BUMP FORMING.

YOU MAKE THEM TO THE SHAPE THAT WE NEED HERE.

AND WE WELD THREE OF THESE SEGMENTS TOGETHER TO FORM THE CONE THAT YOU SEE BEHIND ME.

WE JUST DELIVERED THE FIRST CREW MODULE TO THE LNC BUILDING AT KFC.

IT STARTED A LOT OF THE PARTS ON TO THE OUTSIDE OF THE CM, AND WE'VE ACTUALLY PUT IT IN WHAT WE CALL THE BIRD CAGE SO WE CAN LOCATE ALL THOSE PARTS WITHIN THOUSANDTHS OF AN INCH TO MAKE SURE EVERYTHING IS GOING TOGETHER OKAY.
PUTTING WIRING INSIDE OF IT, PUTTING TUBES FOR THE PROPULSION SYSTEM, PUTTING VALVES AND PUMPS AND JUST ALL OF THAT HAPPENS IN STAGES RIGHT THERE IN THE ONP BUILDING.

WE HAVE AN OLD CONTRACT WITH USA, UNITED STATES ALLIANCE, TO SET UP SHOPS IN THE ONC.

THEIR LITTLE SHOP DELIVERS TO THE BIG SHOPS.

THERMAL PROTECTION IS VERY DIFFICULT IN RE-ENTRY VEHICLES TO TEST AND TO MODEL.

REALLY YOU HAVE TO FLY IT TO REALLY UNDERSTAND WHAT'S GOING TO HAPPEN.

WE'RE BUILDING CERAMIC INSULATION TILES FOR THE BACK SHELL OF THE CAPSULE.
WE'RE BUILDING THERMAL BARRIERS FOR THE CAPSULE AND BUILDING HIGH LAYERS OF INSULATION FOR THAT CAPSULE.

>> I'M THE HEAT SHIELD DESIGN LEAD.

WE'RE DESIGNING AND BUILDING THE HEAT SHIELDS FOR THE FUTURE ORION MISSION.

>> THE HEAT SHIELD RIGHT NOW IS IN OUR BIG 20-BY-20 ROUTER.

IT'S A FIVE-ACCESS ROUTER.

RIGHT NOW IT'S MACHINING THE INTERIOR BOWL IF YOU WILL OF THE HEAT SHIELD.

>> TO CUT OUT THE HEAT SHIELD ON THE ROUTER COULD TAKE WEEKS OF MACHINE TIME RUNNING MULTIPLE SHIFTS.

IT'S THE BIGGEST HEAT SHIELD EVER CONSTRUCTED.

N/A
THE COMPONENT IS THE HEAT SHIELD SKELETON.

SO THAT'S A PIECE OF THE TITANIUM SUBSTRUCTURE, THE BACKBONE THAT MAKES UP THE CARRIER'S STRUCTURE ITSELF.

>> ANOTHER UNIQUE THING IS ALL THE HAND DRILLING THAT WE'RE DOING.

SO IT'S NOT AUTOMATED BY A ROUTER IN THIS CASE.

AND IT ALL HAS TO BE HAND DRILLED BY TECHNICIANS ON THE INSIDE.

>> 200-PLUS TITANIUM PARTS ALL DRILLED TOGETHER.

>> WE HAVE A TOOL THAT PUTS ALL THE PIECES IN THE RIGHT SPOT,

THEN WE DRILL AND PUT THEM ALL TOGETHER.

>> MCR IS TRANSFORMING FROM A SUPPORTING SPACE SHUTTLE AND
SPACE STATION TO A PLATFORM THAT WILL SUPPORT SPACE STATION AND MPCB ORION.

FOR THE FUTURE WE NEED TO GO TO A IMMEDIATE MODERN SYSTEM.

KFC WILL OPERATE THE VEHICLE ON LAUNCH, WILL OPERATE THE VEHICLES ON SPLASHDOWN AND AS FORCES COME IN AND TAKE OVER AFTER THAT.

ONE IS THE LAUNCH CONTROL ROOM WE'RE GOING TO USE FOR ORION SLS FOR EM-1 MISSIONS.

WE'VE BEEN WORKING WITH THE ORION PROGRAM TO GET THE SPACECRAFT DATA SO WE CAN PROCESS IT WITH OUR SOFTWARE IN THE FIRE ROOM.

WE WILL BE FOLLOWING THAT MISSION OUT OF FIRE ROOM ONE.
WE REFITTED THE ROOM.

WE REDID IT PUTTING THE SOUND SUPPRESSION CARPETING ON THE WALLS, MAKING IT MORE COMFORTABLE PLACE TO WORK.

WE'RE AIMING FOR ABOUT 50 PEOPLE IN FIRE ROOM ONE FOR AN EM MISSION.

WE ARE ACTUALLY USING FIRE ROOM ONE NOW TO TEST PAD B SUBSYSTEMS.

THIS IS GOING TO BE ALMOST LIKE A COMPLETE NEW PAD BECAUSE WE WILL HAVE REFURBISHED EACH AND EVERY SYSTEM THAT IS INSIDE THE PAD.

WE'RE GOING TO HAVE THE VEHICLE LAUNCHED FROM THE MOBILE LAUNCHER, AND NOT ONLY LAUNCHED FROM THE MOBILE LAUNCHER BUT HAVE A TOWER THAT WILL HAVE ALL
THE SERVICES ATTACHED TO THE

00:47:29,940 --> 00:47:30,940
VEHICLE.

00:47:30,940 --> 00:47:31,940
THE TOWER IS GOING TO BE ON THE
MOBILE LAUNCHER.

00:47:31,940 --> 00:47:32,940
THE VEHICLE WILL BE ASSEMBLED AT
THE VAB.

00:47:32,940 --> 00:47:33,940
>> IT'S A RETURN TO A CONCEPT
THAT WE KNEW THAT WORKED VERY
WELL DURING THE "APOLLOH"
--
"APOLLO" YEARS WHEN IT HAD A

00:47:33,940 --> 00:47:34,940
PLARM -- A PLATFORM ON IT.

00:47:35,940 --> 00:47:36,940
WE KNEW THE TOWER HAD A LAUNCH
TOWER ON THE PLATFORM.

00:47:36,940 --> 00:47:37,940
WE HAVE TO MAKE SURE THAT VAB
CAN REMAIN ADAPTABLE AND

00:47:37,940 --> 00:47:38,940
ACCOMMODATE DIFFERENT VEHICLE
ARCHITECTURES.

00:47:38,940 --> 00:47:39,940
THAT WE HAD A CLEAN VAB SHELL,
INFRASTRUCTURE, SO WE CAN

00:47:39,940 --> 00:47:40,940
ACCOMMODATE THE NEW HARDWARE,
THE NEW VEHICLE ACCESS WITH THE

00:47:40,940 --> 00:47:41,940
NEW PLATFORMS.

00:47:41.940 --> 00:47:42.940
AND THAT IS A FIRST PHASE THAT
WE'RE DOING NOW.

00:47:42.940 --> 00:47:43.940
>> AND ONCE THE VEHICLE IS READY
WITH ALL THE CONNECTIONS, THE

00:47:43.940 --> 00:47:44.940
ONLY THING WE'VE GOT TO DO IS
MOVE THE VEHICLE FROM THE BACK

00:47:44.940 --> 00:47:45.940
TO A CONNECTION TO THE MOBILE
LAUNCHER.

00:47:45.940 --> 00:47:46.940
AND ONCE WE DO THOSE
CONNECTIONS, WE'RE READY TO

00:47:46.940 --> 00:47:47.940
LAUNCH.

00:47:47.940 --> 00:47:48.940
>> THERE WAS A TIME WHERE I HAD
TO EXPLAIN WHAT A CRAWLER WAS.

00:47:48.940 --> 00:47:49.940
IF YOU DIDN'T WORK OUT HERE AT
THE SPACE CENTER OR IF YOU

00:47:49.940 --> 00:47:50.940
WEREN'T IN THE CENTRAL FLORIDA
AREA, PEOPLE THOUGHT -- SOMEHOW

00:47:50.940 --> 00:47:51.940
THE VEHICLE GOT OUT TO THE PAD.

00:47:51.940 --> 00:47:52.940
WE KNEW WHAT TO EXPECT FROM A
LOAD PERSPECTIVE WITH THE NEW

00:47:52.940 --> 00:47:53.940
VEHICLE, LARGER ROCKET, THINGS ALONG THOSE LINES.

AND THAT GOES FROM THE CRAWLER LIFTED LOAD, THE HYDRAULICS,

ALSO TO THE CRAWL AWAY.

WE'LL HAVE TO INCREASE THE LOAD CAPABILITY FOR THE CRAWL-AWAY ITSELF OF THE ROCK.

WHAT WE'VE ESSENTIALLY DONE IS KEEP ALL THE SAME HYDRAULICS BUT INCREASED THE SIZE AND DIAMETER OF THE HYDRAULICS NUMBERS.

LAST NOVEMBER WE ACTUALLY TOOK A RIDE OUT WITH THE COMPLETED CRAWLER TO THE PAD AND TESTED OUT THE SYSTEM AND A COUPLE PUNCHED ASSIGNMENTS, BUT EVERYTHING WORKED GREAT.

THE CONTROL SYSTEM HAD BEEN UPGRADED.

THE CABINET -- THE DRIVER'S CONSOLE HAD BEEN REPLACED.
THE BRIGGS HAD BEEN REPLACED.

NEARLY EVERY SUBSYSTEM HAD SOME WORK DONE TO IT.

THE TRACTION SUPPORT ELEMENTS, EACH OF THE FOUR CORNERS HAD 22 ROLLERS, ABOUT THE SIZE OF A CAR TO BE HONEST WITH YOU.

AND WE'RE CHANGING OUT ALL OF THOSE, ENLARGING THOSE, AS WELL.

>> WHAT I LOVE DOING IS REMINDING THE OUT WORLD WHETHER IT'S WITHIN OUR GOVERNMENT OR ESPECIALLY THE MEDIA THAT HAS A PERCEPTION THAT WE'RE IN A LULL, THERE'S NOTHING GOING ON, THAT

-- YOU KNOW, THE SPACE PROGRAM'S SHUTTING DOWN, TO KIND OF DISPEL THE RUMOR AND SAY, NO, THIS IS THE FAR OPPOSITE FOR US.

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>> I'M PRIVILEGED TO WORK THIS PROGRAM.

I THINK MOST PEOPLE WHO WORK IT TODAY FEEL THE SAME WAY.
>> I CAN'T BELIEVE THEY PAY ME FOR THIS JOB.

999
00:48:28,940 --> 00:48:29,940
IT'S WONDERFUL.

1000
00:48:29,940 --> 00:48:29,941
GREAT.