NASAs Succeeds in Testing of Advanced Rotating Detonation Rocket Engine for New US Space Flight Capability – Thomas Teasley ER13| NASA MSFC

June-August 2022, NASA engineers at Marshall Space Flight Center in Huntsville Alabama have successfully fired two regeneratively cooled advanced rotating detonation rocket engines (RDRE's). The engines have accumulated 17 starts at over 600 seconds of total duration. Multiple firings were achieved of greater than 110 seconds each with detonation modes. A single full throttle test produced over 4000 lbf for 15 seconds with detonation modes. The mean pressure at a single point on the injector face was 620 psia. These tests completed the project's main objective: demonstrating that additive GRCop-alloy hardware could survive long durations while subjected to the detonative events. 4-5 co-rotating detonations were observed during most tests with a single test showing 2-3 waves. Several other milestones were also achieved including successful demonstration of active throttling with detonation modes, successful ignition without a predetonator, and the use of novel additive manufacturing techniques. The primary collaborator was IN Space, LLC (West Lafayette, IN) through an STMD announcement for collaborative opportunity (ACO). Hot fire testing was conducted at Marshall Space Flight Centers heritage east test area at Test Stand 115 in collaboration with Marshall ET10.