

F-35 Joint Strike Fighter

What Actions Are Needed To Improve Aircraft Reliability?



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GAO Reports on F-35 Reliability

- **Source of our work:** The National Defense Authorization Act for Fiscal Year 2015 included a provision for GAO to review the F-35 acquisition program until it reaches full-rate production, looking at all aspects of the acquisition program.
 - April 29, 2019, [GAO-19-341](#), F-35 JOINT STRIKE FIGHTER: Action Needed to Improve Reliability and Prepare for Modernization Efforts
 - June 5, 2018, [GAO-18-321](#), F-35 JOINT STRIKE FIGHTER: Development Is Nearly Complete, but Deficiencies Found in Testing Need to Be Resolved

The F-35's Reliability & Maintainability (R&M)

1. Background
2. F-35 R&M Performance
3. Why isn't the F-35 meeting all of its metrics?
4. What We Recommended
5. What the F-35 Program Is Doing

Background

- DOD estimates that it will cost over \$1.1 trillion to sustain the F-35 through 2077
- F-35 R&M performance is measured against eight metrics
- The program's Operational Requirements Document (ORD) outlined these eight R&M metrics; it was approved in 2000
- Only half of the ORD metrics were included in the F-35 total system performance responsibility (TSPR) development contract.

F-35 R&M Performance

- All F-35 variants generally performed near or above targets for the four contractual R&M metrics while the other four still fell short
- Several metrics (including contractual) have not been met at the F-35As design maturity—July 2018, and are projected to not be met for the F-35B and F-35C’s design maturity—in 2021 and 2024.
 - For example, according to DOT&E, "All mean repair times are longer, some up to more than twice as long, as their original ORD threshold values for maturity, reflecting a heavy maintenance burden on fielded units."
- We found that the program had not taken adequate steps to ensure all the variants would meet all of the R&M metrics, and this is still true as of April 2020

F-35 R&M Performance, as of Aug. 2019

Metric	On Contract	F-35A	F-35B	F-35C
Mission Reliability	✓	○	●	—
Mean flight hours between failure—design controlled	✓	●	●	●
Mean time to repair	✓	○	○	●
Maintenance man hours per flight hour	✓	●	◐	●
Mean flight hours between maintenance events		○	◐	◐
Mean flight hours between removals		○	○	○
Mean flight hours between critical failure		○	○	○
Mean corrective maintenance time for critical failure		○	○	○

Legend	Symbol
Metric is at or above current targets	●
Metric is at or above minimum targets	◐
Metric is below minimum targets	○
Metric is not available	—
Metric is contractually required	✓

Why isn't the F-35 meeting all of its metrics?

- From the start of the F-35's development, the program chose to include only half of the ORD metrics in the contract
- The F-35 program office acknowledged it was not focused on meeting the R&M metrics.
 - Program officials acknowledged that its improvement plan does not include an objective to meet the eight ORD metrics
 - Program officials are using the R&M improvement plan to prioritize funding for projects that are broadly aimed at improving aircraft availability (fleet goal of 65%) and mission capability (fleet goal of 80%)—neither of which are specifically aligned with the eight R&M metrics, but are necessary and important initiatives

Recommendations in [GAO-19-341](#) and [GAO-18-321](#)

1. Identify what steps are needed to ensure the aircraft meet R&M targets before each variant reaches maturity and update its improvement plan with these steps
2. Assesses whether the ORD R&M targets are still feasible and revise the ORD accordingly
3. As it revises its R&M improvement plan, identifies specific and measurable R&M objectives in its plan
4. As it revises its plan, identify and document which improvement projects will achieve those R&M objectives
5. Prioritizes funding for the improvement plan

What the F-35 Program is Doing

- It is addressing all 5 recommendations:
 - revising the improvement plan (as of September-November 2019)
 - Identifying what ORD revisions are needed
 - Moving scope of improvement plan to non-annualized contract
 - Allocating more funding for R&M improvements in 2020 and future years
- Is required to report to Congress on its R&M per the 2020 NDAA, section 167
 - Review and assess R&M
 - Determine feasibility of ORD metrics, and any changes to them
 - Certification that the improvement plan
 - ✓ Identifies specific and measurable objectives, and
 - ✓ Which improvement projects help to achieve those objectives

In Closing

The F-35 program office has estimated that implementing all of the identified improvement projects currently contained in its R&M improvement plan could result in potential life cycle cost savings of over \$9.2 billion by improving the F-35's R&M.



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