

**Third Report to Congress on
F-35 Concurrency Costs:
House Report 112-331, Conference Report to Accompany
H.R. 2055**



**Office of the Under Secretary of Defense for
Acquisition, Technology, and Logistics**

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Preparation of this report cost the Department of Defense
approximately \$8,710 for the 2012 Fiscal Year.
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Background

This report responds to language on pages 584-585 of House Report (H.R.) 112-331, the Conference Report to accompany H.R. 2055, the Military Construction and Veterans Affairs and Related Agencies Appropriations Act, 2012, which states:

“The conferees recognize that, for a variety of reasons, the Joint Strike Fighter program is burdened with what could be the highest level of concurrency ever seen in an acquisition program. Therefore, the conferees direct the Secretary of Defense to provide a semi-annual report to the congressional defense committees that shows the actual concurrency costs for the Joint Strike Fighter program. The report showing these actual concurrency costs shall be made available to the Director, Cost Assessment and Program Evaluation for the purposes of cost estimating and to develop lessons learned from allowing programmatic concurrency, so this cost can be considered when decisions are made regarding allowing such a high degree of concurrency in future programs.”

Introduction

This is the third report on F-35 concurrency costs submitted as requested by House Report 112-331. The first and second reports were submitted in September 2012 and May 2013, respectively. Pursuant to an e-mail exchange between representatives of the conferees and the Department on October 17, 2013, the F-35 Joint Program Office (JPO) received permission to submit an annual report. As a result, follow-on reports will be submitted within 30 days of the President's Budget submission and will track F-35 concurrency costs through the remainder of the development program.

Concurrency is defined as the overlap in the development and production phases of an acquisition program. Concurrency introduces the risk that aircraft built in early production lots will require modification due to discoveries made during qualification, flight and ground tests, or as a result of engineering analysis. Incorporation of concurrency changes adds cost due to recurring engineering efforts, production cut-in, and retrofit of existing aircraft. Not included in these costs are the nonrecurring engineering costs associated with these changes, which are a part of the System Development and Demonstration (SDD) program costs. Planned and scheduled block upgrades to each aircraft are handled separately and are not considered concurrency costs. Concurrency costs will phase out with the completion of SDD.

For any given production lot, there are three types of concurrency changes: (1) changes discovered prior to beginning of the production of the lot (Period A); (2) changes discovered during the period of performance of the given lot (Period B); and (3) changes discovered after delivery of the last aircraft in the given lot (Period C).

F-35 concurrency changes are funded under procurement appropriations *Aircraft Procurement, Navy* and *Aircraft Procurement, Air Force*. These two appropriations align to Budget Activity (BA) 01, in which combat aircraft are procured, and BA 05, in which in-service aircraft are modified. The BA in which these changes are funded is dependent on the timing of a

change in relation to a specific production lot. The program office plan is to fund Period A and B concurrency changes in BA 01 with Period C changes being funded in BA 05.

Cost Model

The concurrency costs reported in May 2013 were based on a discrete, bottom-up engineering analysis. The costs account for technical issues affecting air vehicle performance, mission systems required for combat operations, and aircraft structures. The current estimate contained in this report reflects the same approach. It has been updated to account for known issues that have been realized since the submission of the May 2013 report and for adjustments to forecasted issues as a result of schedule changes in remaining tests. Below are the definitions for known and forecasted issues.

- **Known Issues:** A technical issue that has been discovered during qualification, flight, and ground test events, and deemed deficient to the contract specification.
- **Forecasted Issues:** An issue that may occur in the future based on historical qualification, flight test, and ground test data of other programs to include the F-16, F-15, F-22, and F/A-18E/F.

The cost estimate for known and forecasted issues is developed from the actual costs of approved changes that are being implemented. While all forecasted issues may not occur, some un-forecasted issues are likely to arise during testing. As changes become known, the discrete costs of these changes accrue and become a liability to the program. The aggregate liabilities represented in known and forecasted issues, rather than actual outlays of funding, provide a better descriptor of the impact of concurrency to the F-35 program. Retrofit activities compose the major portion of concurrency costs. Retrofit activities to production aircraft began in January 2012 and have included the F-35B Auxiliary Air Inlet Door Assembly, the F-35B Fuselage Station 496 Bulkhead modification, and the Forward Root Rib modification for the F-35A and F-35B.

Current Concurrency Cost Estimate

Figure 1 on page 4, *US Government F-35 Total Concurrency Cost*, depicts a summary of the current February 2014 estimate along with the two estimates previously reported. Figure 2 on page 4, *US Government F-35 Concurrency Cost by LRIP Lot*, portrays total estimated concurrency cost for each Low Rate Initial Production (LRIP) lot. The purple shaded area in both Figures 1 and 2 shows the cost estimate of known issues. The gray shaded area shows the forecasted concurrency change cost through the end of development. Figure 3 on page 5, *US Government F-35 Average Projected Concurrency Cost per Aircraft*, presents the average unit cost per aircraft for all three estimates.

Changes from May 2013 Report

Overall, the F-35 concurrency cost estimate remains stable, with the estimate for March 2014 reducing slightly from the previous report. The May 2013 estimate was \$1,750 million and the February 2014 estimate is \$1,650 million as reflected to Figure 1. The

changes between the two reports are further broken down by LRIP in Figure 2; these changes are attributable to several factors:

- Reductions in forecasted issues for LRIPs 4 – 6 are a result of issues that have been retired (no anticipated failure occurred and therefore no cost liability) or rescheduled (due to deferred testing).
- Increases in forecasted issues for LRIPs 7 – 9 are a result of forecasted issues that have shifted out from earlier LRIP lots due to rescheduled testing.
- Early production cut-ins of forecasted issues anticipated in LRIP 10 resulting in fewer aircraft requiring modification.

Conclusion

Since the submission of the original report, Lockheed Martin (LM) has worked collaboratively with the F-35 JPO to implement a joint concurrency management system. This system reduces the length of time required to implement a change into the production line, thereby reducing the number of aircraft needing future modification. An example of successful implementation of the concurrency management system can be seen in the Panoramic Cockpit Display – Electronic Unit change incorporation, where acceleration prevented the need to retrofit 62 U.S. aircraft after delivery. The system records meaningful information on the status and progression of discovered technical issues and change requests. It includes monthly delivery of metrics to demonstrate change incorporation process improvement over the remainder of the program, and it tracks all change requests in both production incorporation and retrofit modification. The joint JPO-LM Concurrency Management Team meets monthly to review these metrics and assess additional improvements to the concurrency management system.

Contract actions are also in place to reduce concurrency costs to the Government. In addition to the LRIP 5 contract, the LRIP 6 and 7 contracts contain clauses that implement 50/50 cost sharing with no fee for concurrency changes known prior to contract award that will not be incorporated until after aircraft delivery. This cost-sharing approach is intended to motivate LM to incorporate concurrency changes as quickly as possible on the production line.

The F-35 JPO anticipates that known costs will continue to converge toward the total projected estimate until development has completed. Estimates will be reviewed and updated on an annual basis; these will contain adjustments as a result of retiring, realizing, re-scheduling, or adding changes as the program progresses. Subsequent reports to the congressional defense committees will capture these updates. This report has been coordinated with the Director, Cost Assessment and Program Evaluation in order to derive lessons learned regarding concurrency and the corresponding cost implications that can be applied to future acquisition programs.

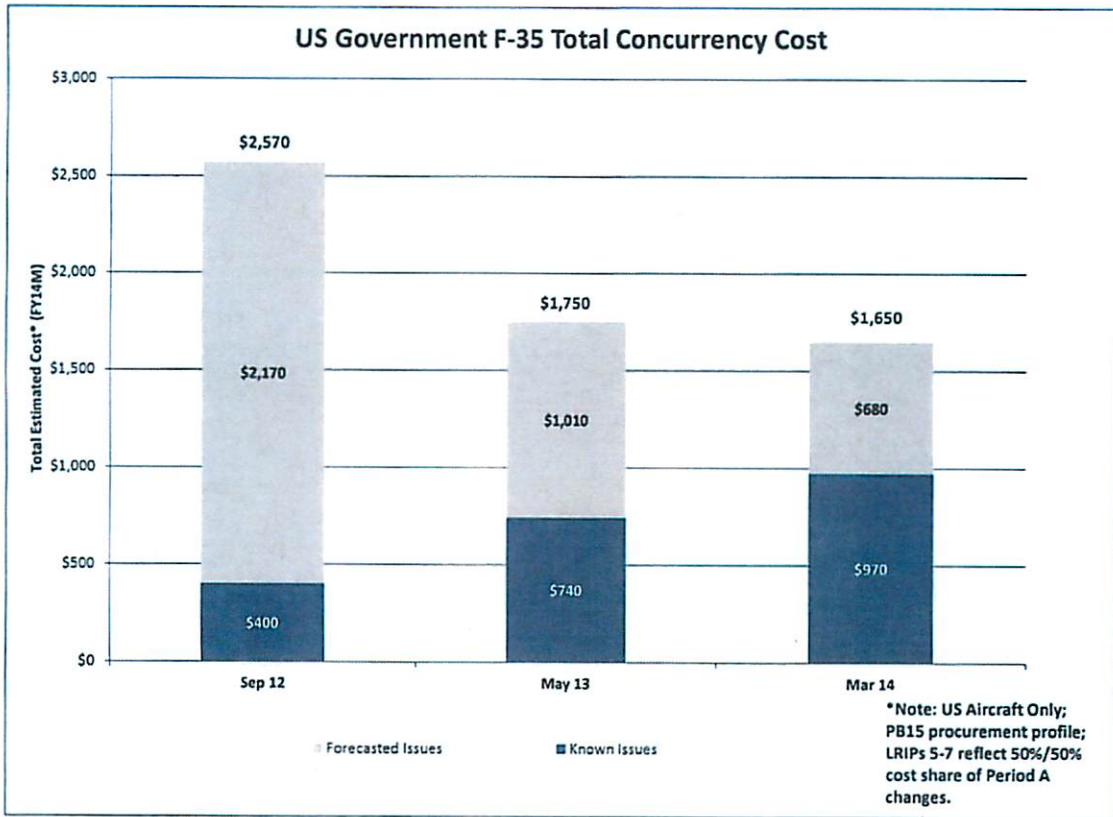


Figure 1

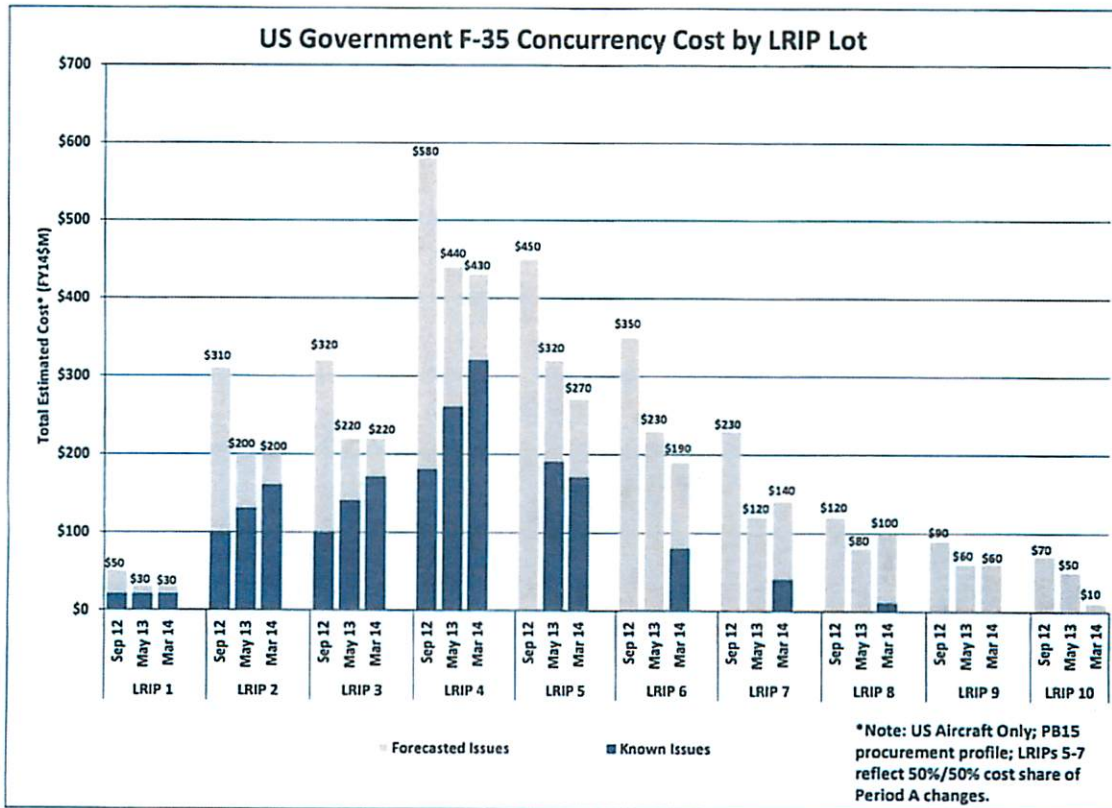


Figure 2

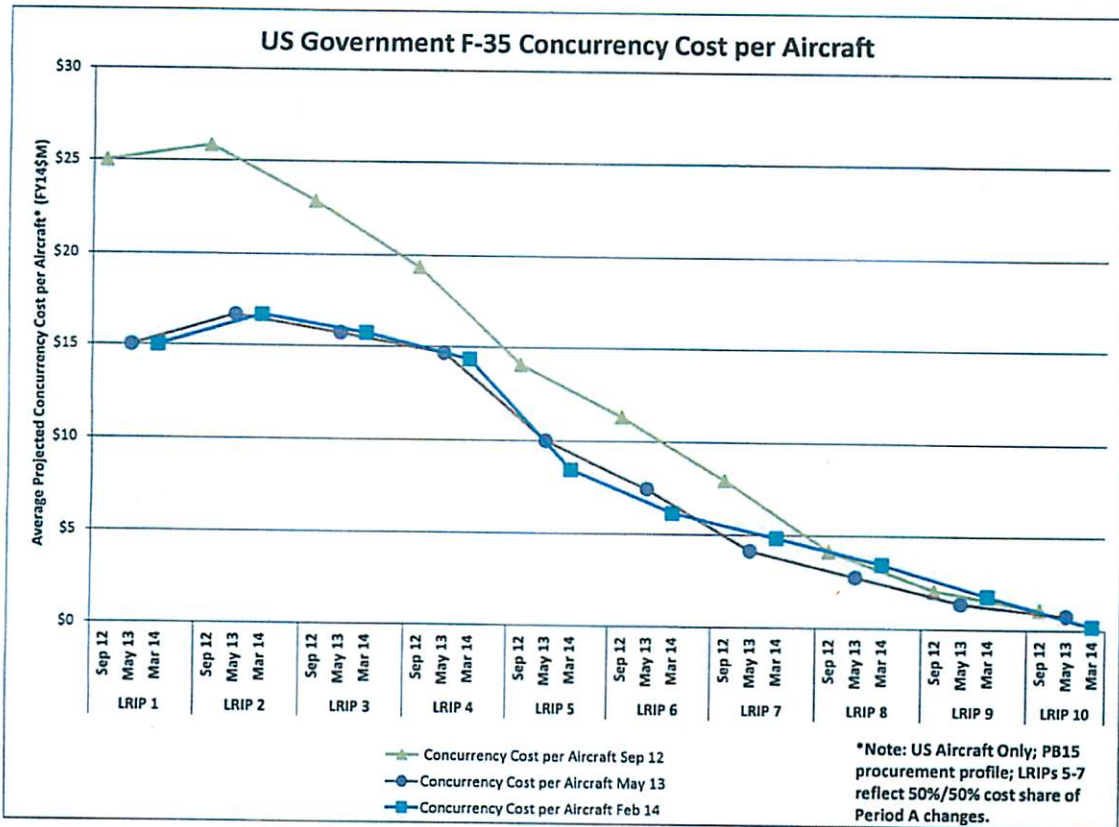


Figure 3