

# Joint Strike Fighter – Lightning II Monthly Assessment Report

Prepared for the Joint Strike Fighter Program Office (JSFPO)

Prepared by DCMA Lockheed Martin Fort Worth

N00019-02-C-3002



17 September 2007

## Table of Contents

1.0 JSF Executive Summary .....	3
2.0 PBM Assessment Matrix .....	5
3.0 .....	5
4.0 .....	8
5.0 Production / Airframe – LMFW .....	9
6.0 Vehicle Systems .....	12
7.0 Mission Systems .....	14
8.0 Propulsion .....	16
9.0 Earned Value.....	19
10.0 Process Reviews .....	21
11.0 Appendix A.....	22

## 1.0 JSF Executive Summary

Return to flight testing for AA-1 will presumably occur in October. DCMA views, with concern, the number of recent anomalies which have impacted flight test development. Issues such as: the

vet to be determined resolutions for the IPP Turbomachine failure on the Integrated Test Stand (ITS); ICC VSIF testing failures and multiple regression tests to be performed, are coupled with AA-1 having not flown since early May 07. These examples, and the risks associated with concurrent development, elevate concerns and jeopardiz.

the flight test program schedule. A definitive solution and subsequent delivery of airworthy hardware to AA-1 has been delayed by recent re-qualification testing failures. Additionally, F135 IFR engine operation has been temporarily prohibited and is a factor for AA-1's return to flight. On 30 Aug 07, during STOVL FFR AMT qualification testing, engine

Data indicated a change in performance accompanied by a slight vibration around ten minutes prior to the event.

Engine disassembly has begun. Until the root cause of the event is understood, IFR Flight Test Engines (both installed and uninstalled) are temporarily prohibited from operation. This is a normal restriction, pending investigation results. This may impact STOVL first flight as well. Planned Edwards deployment for AA-1 is now early December in anticipation of successful return to flight activities at Fort Worth.

LM Aero has initiated their Estimate at Completion 6 (EAC6), estimated to encompass 12 Sep - 16 Nov 07. Some initial considerations in the EAC6 planning are; LM Aero will start notification for reductions of JSF personnel in Nov 07 which would effectively be realized in the Jan 08 budget. Expectation is around 4% to 5% initial personnel, with reductions in areas such as Airframe (WBS 1200) and subsequent increases in areas such as Global Production (WBS 3000) are expected by year end. LM Aero plans to continue the next two years (Jan 2008 thru Jan 2010) with an estimated 8.5% to 10% further reduction in personnel.

One effort to mitigate continuing negative cost variance and Management Reserve (MR) expenditures is a Mid-Course Risk Reduction (MCRR) plan. In part, the current proposal deletes two Mission System (MS) SDD aircraft. Program Approval Notice (PAN) 07-D-0021 directs action to begin asset reduction of AF-5 and CF-4 from the program. Aircraft BF-5, CF-3, and Low Rate Initial Production (LRIP) aircraft will assume all MS testing requirements. Suppliers are waiting for the order to cease production. A restructuring of the test program, well as aligning resources in various areas will be needed as well and could potentially add risk. MCRR execution discussions are ongoing. As a result of EAC and MCRR efforts, the program will see another Master Schedule change (MS6). It should be noted that another Master Schedule will enable schedule relief (SPI reset to 1.0).

The DCMA Earned Value Center completed their two week on-site review of LM Aero's compliance of ANSI/EIA-748 EVMS Guidelines.

The final evaluation report is expected sometime in October, with a reevaluation visit from the EV Center approximately twelve months after report release.

Production Status (As of 9 Sep 07)	
Forward Fuselage	5 - Assembly 3 - Mate
Center Fuselage	10 - Assembly 1 - On Dock at LM (BF-3) 3 - Mate
AFT Fuselage	5 - Assembly 3 - Mate
Wing	6 - Assembly 1 - Mate
Mate & Delivery (EMAS)	3 (BF-1, BF-2 & BG-1)

**BF-1** – All major components have been permanently mated. Completion of Wing progress has been slower than projected. Fabrication of Flight Test Instrumentation (FTI) hardware (brackets/tubes) and delivery of critical parts continue to present challenges the targeted 22 Oct 07 power-on date. It is assumed by LM that a 3 shift / 6 days per week strategy, requiring ~1000 hours earned per week, will be needed to complete Wing build. Many power-on critical part issues are being worked and will require work-around implementation to support system check-out efforts. Additionally, development of numerous release authorization notices (RANs) with a minimum of Level 2 is required prior to power-on activities. EBOM/MBOM reconciliation remains a concern and could potentially impact future part shortage issues. The on time delivery of BF-1 Software is in question; SPARs are impeding approx 30% of R17 testing and are impacting STOVL flight control laws. Based on V16 PSDM, handling qualities are expected to support Level 1 flight requirements. Current control laws have maturity to proceed.

**AF-1** – Schedule continues to degrade and is in jeopardy. Data as of 10 Sep 07 shows a status of: Forward Fuse is 49% complete and -55 Mdays to MS5; Wing is 10% complete and -63 Mdays to MS 5; Aft is 25% complete and -32 Mdays to MS 5; Center is 74% complete and -10 Mdays to MS5. The critical path for the Wing has not met planned work nor met planned span times. AF-1 First Flight date for 5 Jan 09 is optimistic at best.



#### **STOVL –**

BF-4: As of 13 Sep 07, BF-4 continues to work systems installation in J330b. Approximately 65% of the work in J320 has been completed in J330b; and ~4.5% of J300. There is ~482 hrs of work still open in J345. There is a specific wire harness Change Request impacting harness 2CWH41501; which would require extensive rework in the neighborhood of ~2,000 hours; primarily due to the necessity of de-building the unit. LMA has decided to accept the transfer of this work to Fort Worth. This is another indicator that the

The CR changes to the harness described above required significant rework such that if the rework was done on BF:1, the harness would not fit on the Aircraft. Thus the decision to rebuild the harness was made. This harnesses is in process of being manufactured at and then shipped to for possible installation on the BF:4 AC before shipment if possible. If the harnesses cannot be installed at this work will travel to Fort Worth. This has been coordinated with all parties involved and the sense of urgency to complete this task has been raised to the appropriate level. In this case the Wire Harness Change Request process was able to determine the possible options and has implemented the best option available. This type of change that is discovered late in the build process does not represent an ineffective Wire Harness Change Request process.

BF-5: As of 13 Sep 07, not loaded; scheduled to load 24 Aug 07; however with CV units delaying entry into the duct cost centers this start will be delayed at least 6 weeks due to tool availability.

#### **CTOL –**

As of 13 Sep 07, AF-1 is in J330c- working the routing of wire harnesses in the R/H weapons bay and installation of systems bracketry in the L/H weapons bay; in addition to critical fuel tubes and electrical grommet in J320. The majority of behind schedule condition (~ 6,651 hrs) is due to J345/320 parts issues; late weapons bay keel web, late TFE, critical fuel tubes, and

electrical grommets impacting systems installation. still possess enough margin (using weekends/overtime) to meet the 30 Oct delivery date to LMA; however this requires a 3.5% completion rate per-week which will be a challenge; current target is 26<sup>th</sup> of Oct (in-place at PMC).

AF-3 is in J345c working fuel systems (fuel tubes) and other initial upper systems and skin installation. The proposed new delivery date of 8 Apr 08 would only allow 1 month of margin to install the gun trough Blast Port Assembly. The current ECD for the AF-3 Forward Gun Access Panel remains unknown; however other critical gun trough assembly pieces should be delivered 2 months prior to AF-3's proposed shifted delivery date.

#### CV -

As of 13 Sep 07, CF-1 is in cost centers J351a (Center Tank Assy.) and J355 (270 BlkHd/F1 tank mate to Fwd intake ducts). The CF-1 bulkhead assembly in J355 remains jig-locked out of moving into the J351 cost center (including J351 paint), and the two cost centers will not be able to move forward until the tank assembly in J355 completes. CF-1 tank assembly jig-critical parts are significantly late - keel delivery will now be over 17 weeks (4 months) late to MND with an ECD of 22 Sep 07. The Drag Brace assembly has a non-conformance tag which will now be worked at to avoid further delays.

CF-3: currently in J353a and J354b (STOVL/CV) positions. This unit is also showing impacts in J355; the fuel floor is reporting 2-months late along with the keel.

CG-1 thru CF-3 all reporting Keels/Drag Brace/BlkHds approximately 3.5 to 4 months late to need dates

CF-2 & CF-3 - Inlet lips projected to be 3 to 4 months late; fuel floors are 1 month late; however CF-4 and CJ-1 inlet lips and fuel floors are currently projected to deliver on-time.







## **6.0 Vehicle Systems**

Track to BF-1 First Flight is rated yellow due to moderate risk of some supplier's current system design maturity, delayed component deliveries, ongoing trade studies and schedule delays for various qualification testing. (i.e. Formal Qualification Testing (FQT), Safety of Flight (SOF) and Software Qualification Testing (SQT), etc.)

PTMS – On 21 Aug 07, the PTMS experienced a shut down while operating in cooling bleed mode. On disassembly the Forward Module's (S/N D0004) cooling turbine was found badly damaged and the tie shaft broken at the turbine end. The evidence showed that the cooling turbine had contacted the shroud (containment housing) and all the turbine blades were damaged. The Turbomachine (S/N 0003) was returned to Phoenix for disassembly. While removing the Forward Module from the Turbomachine, it was found that the quill shaft was broken. The Forward Module was returned to Torrance on 24 Aug 07 for detail analysis. During teardown, it

WBS 3100 performance to date has been degrading over the last five months and is primarily due to WBS 3140 Wing build performance. All up Wing behind schedule over cost condition has steadily grown.

Part shortages, complex parts, engineering change traffic, QARs, late planning, and a host of other factors continue to impact the mechanics ability to earn budget in an efficient manner. In addition, as of 2 Sep 07, BF-1 wing latest budget hour burndown (new) projection is off track by -464 hours. LM mitigations include: Standing up advanced workable set up teams to review job packages prior to assembly start, design and tooling changes to reduce metrology work, and increasing manpower and outsourcing to reduce planning backlogs.

DCMA PA Production personnel at LMFW continue to participate with LM's 6S Continuous Improvement Team (Tool Storage & Retrieval Process); goal is to improve the existing tool storage and retrieval process in the Wing manufacturing area. New storage area defined, process for tool retrieval developed, AC-4881 compliance initiated, LM working compliance gaps. Estimated completion dates in development and roadmap to compliance is in work.

Forward Fuselage Assembly (Risk – Moderate): (No change) Manual Hole Drill / Prep continues to be the top defect driver.

Wing Assembly (Risk – Moderate): (No change) Manual Hole Drill /Prep continues to be the top driver for defects in this area as well.

Mate (Risk – Moderate): (No Change) Defects for hole issues and fastener installs are the main drivers in this area.

Flight Ops / Delivery (Risk – Moderate): 2AA-1, Customer Concern (ICA # 69008) Follow-up surveillance has revealed no additional areas of concern. Contractor personnel have increased awareness of persons working the flight aircraft, and have conducted periodic checks to ensure adequate work instructions are present and are being followed. Additional surveillance will be conducted by DCMA before ICA closure.

Although changes in Engineering, EWI, and workmanship discipline issues have been reported previously, DCMA has noted through process audits that these issues are exacerbated by outdated information (AEA's Advanced Engineering Authorizations) being left in the work instruction alongside the new (AEA) information. This has caused confusion to the assemblers and created additional rework. DCMA will investigate this further to ensure engineering changes are carefully controlled during implementation.

Contractor corrective action (CA) measures are being undertaken to focus on the hole drilling / location / size issues, many of which are created by attempting to locate provisions (brackets) out of station by manual means. CA will be attained by using computer placed outlines on the areas requiring provision placement, however, this will continue to be an issue until that capability is introduced (Date TBD) which could be in the distant future.

was found that the bore seal (ceramic material) for the main rotor had broken into multiple pieces and the Control PMG stator was badly torn due to its rotor radial displacement. A tiger team will be convened to determine root cause and corrective action.

Current schedule variance was negative. The largest negative schedule driver 1334, LM-Aero Cost-Plus Supplier for Electro-Hydrostatic Actuation System (EHAS) was due to late start on CV test equipment due to parts availability issues, and delays in STOVL software delivery caused by a larger than expected number of problem reports to be resolved. The next largest negative schedule driver was from 1340, LM-Aero Fixed-Plus Supplier for Landing Gear due several hardware deliveries being missed including STOVL Left and Right MLG. The cumulative schedule variance has deteriorated from Current cost variance was a positive. The cumulative cost variance has slightly degraded from

#### Supplier Schedule –

A total of 15 components remain to be delivered which are required for BF-1 initial power-on schedule for 22 Oct 07.

Tactical Navigation System – The TNS contract delivery is on schedule to be shipped third week of Sept 07. One INS (AA-1) was shipped on schedule in Aug 07.

EHAS – held an IRT meeting with LM in June and issued a return to flight (RTF) schedule. The schedule was approved by LM, and is subsequently executing to that schedule. A new ECP will be submitted to cover all the AA-1 modifications. indicates that the ECP will not cause a change in SOF testing or any penalty testing, but is currently on hold pending completion of AA-1 investigation. The revised RTF EU has passed altitude and endurance testing. All EUs are being returned for upgrades. Discussions continue on which version of EU will be used for B-1 first flight. The -9 EU configuration will be used in SOF testing. The -10 EU configuration will be used on STOVL B-1 first flight (the -9 configuration fixes the spacing problem for RTF and the -10 configuration is a complete redesign).

All CTOL Flaperon, rudder and LEFAS EUs have been inspected for arcing problems and have been returned to LM in Aug 07. The horizontal tail EU is currently scheduled to be delivered in Sep 07.

Intermediate Design Review (IDR) is scheduled to be held late Sep 07. A comprehensive Flight Control Actuation System (FCAS) TIM was held in August with focus on outstanding EHAS design issues that will need to be addressed for the upcoming IDR. Technical discussions during the TIM gave high confidence that outstanding performance issues that may remain for the IDR should at least be addressed with some level of suitable mitigation planning.

Power Thermal Management System – Item 1 (2WTV00001-0002, PAO/Fuel/Hydraulic Oil Heat Exchanger) BF-1 SOF vibration testing has completed 15 minutes in each of the axis. During testing several cracks were noted on the skin panel that simulates the fuel cell fuselage. Due to lack of a spare skin, temporary repair was performed until new panel can be procured.

Item 218 (2CTV00218-003, Heat Exchanger Assembly, TMS) Hardware and associated fixtures for the vibration testing are in place but start of testing will be pending Item 1

SOF completion. Shipment for BF-2 will be 2 weeks late due to leakage in the manifold and will require repair.

Item 221 (2CTV00221-003, Heat Exchanger, Air to Hot PAO) Qualification failure analysis is complete. Honeywell has determined that their fatigue strength correction factor for welding zone proximity was inadequate and caused the failure. Stress recalculation using the new correction factor is in work. Detail design to address failure is to be completed by 31 Oct 07, with hardware delivered by Mar 08. Qualification testing will be rerun after new hardware is available. Unit installed on aircraft BF-1 will need to be replaced and detail retrofit plan is in work.

Item 121(2CTV00121-0004, PTMS Controller) - EMI SOF tests started on 31 Jul 07. The BF-1 unit passed CS115 and CS116 requirements. However, outages were noted in CE134, but test results have greatly improved from AA-1. Unit failed RE102 and is about the same as AA1. Currently the unit is undergoing RS103 testing; some susceptibilities were noted but greatly improved from AA-1.

Landing Gear System – BF-1 LH Main Landing Gear (MLG) was shipped on 10 Aug 07. Piston leakage in the BF-1 RH MLG, scheduled to be delivered 31 Aug 07 has been delayed. The pistons have been returned to the subcontractor for repair or replacement.

Deliveries of the BF-3 and STOVL Spare Nose Landing Gears (NLG), originally scheduled for 30 Sep 07 delivery, may be impacted due to International Trafficking in Arms (ITAR) issue on the Wheel and Tire assembly. The assembly will be available for shipment 8 weeks after State Department approval of the Technical Assistance Agreement/Master Licensing Agreement. The original agreement did not allow for subcontracting and sublicensing.

The STOVL Main Landing Gear tire configuration has not been defined due to test failures. A variance may be required to allow shipment of gears with tires approved for roll around only. Significant technical issues remain regarding the Brake Control Unit and manifolds manufactured by [redacted] s negotiating revised delivery dates and requirements with these subcontractors.

## 7.0 Mission Systems

1437 ICP – The EV rating this month is yellow for the first time after being in the red for the last 17 months. The yellow rating is based on the VAC% between [redacted] EAC and DCMA's IEAC. [redacted] is reporting a lower ACWP this month (an error was discovered in one of their ACWP accounts). This resulted in a calculated CPI of 1.57 for the July performance period. This CPI had the domino affect of improving the overall outlook of ETC, EAC, etc. LMMS2 is undergoing a bottoms-up EAC review – results should be seen in the Oct 07 CPR.

The following SW Productivity table provides the required and an estimate of the actual block 0.1 and 0.5 software productivity for each of the major software teams. This table shows results of SW Productivity calculation that uses cumulative hours since the over target baseline (OTB).

**SW Development Lifecycle Productivity Table:**

WBS 1425 SW Productivity calculations are not shown because no hours charged to activities were considered in the SW Productivity calculation.

Green: > -5% Variance  
Yellow: -10 to -5% Variance  
Red: < -10% Variance

Within the 1420 WBS' and considering only those hours since OTB, Block 0.1 is 95.2%, and Block 0.5 is 80.4% complete. Considering all hours since inception within 1420 WBS' (i.e. 142X), Block 0.1 is 97.3%, and Block 0.5 is 82.2% complete.









## 9.0 Earned Value

DCMAs IEAC will continue to show variance to the LM Aero EAC, primarily due to program management decisions to manage to the budget; subsequently the LM Aero BAC is almost equal to their EAC.

DCMAs view is that the SDD contract cannot be executed within the content and scope of the current budget, as evidenced in repeated Master Schedule revisions, deletion of content (removal test articles - CH-1 as part of EAC 4) and the plans to continue deletion of content as evidenced in LM Aero Program Approval Notice (PAN) 07-D-0021 (removal of AF-4 and CF-4 Mission Systems aircraft). AF-4 presents a cost impact of \_\_\_\_\_ to EAC6 GR&A because of Flt Science instrumentation unique installation and spin-chute/harness storage. Projected savings for dropping AF-5 & CF-4 is approximately \_\_\_\_\_ (there could be as much as a \_\_\_\_\_ decrease in savings due to hardware/labor impacts). To date, the following amounts have been expended before the drops: AF-5 \_\_\_\_\_ & CF-4 \_\_\_\_\_. Suppliers are waiting for the order to cease production.

DCMA JSF – July 07 Data

Lockheed is now reporting to an Over Target Baseline of \_\_\_\_\_ reported in the Cost Performance Report (CPR). The July 2007 cost summary is as follows:

	BAC	LM EAC CPR	DCMA IEAC
Performance Measurement Baseline (PMB)			
Management Reserve (MR)			
Total:			

Table 1. Budget Baseline and EAC Summaries

Primary Trip Wires		Secondary Trip Wires				
System Indicator	Baseline Indicator	SPI	CPI	CPI/TCPI 10%	Contract Mods 10%	Baseline Revs 5%
Y						

A baseline assessment shows the contractors BAC and EAC to be optimistic. To complete the contract within the CBB, the contractor needs to be about 12 per cent more efficient. The BAC has increased by 36% since the start up in Cot of 2001. The cost growth is likely to increase due to inherent engineering risks in the first versions of S1OVL and CV aircraft.

Secondary Trip Wires –

- $SPI = BCWP/BCWS = 0.987$
- $CPI = BCWP/ACWP = -0.982$

- $CPI/TCPI = 0.982/0.888 = 1.106$
- $Contract\ Mods - (BAC\ now)/original\ BAC\ 10/01 = 1.359$

The DCMA Risk Rating for EVMS at the total program level is rated yellow - using the agreed to parameter of VAC (-5.76%). Compare this to the Lockheed's EAC and one can see a difference of over 5%. Similarly, the  $TCPI_{EAC}$  is different when using the DCMA IEAC versus the contractor's EAC:

$$\begin{aligned} TCPI_{DCMA\ IEAC} &= 0.882 \\ TCPI_{LM\ EAC} &= 1.019 \end{aligned}$$

In response to Government concerns, the DCMA Earned Value center conducted a Compliance Review 20 - 31 Aug 07. Over that period of time several types of issues were identified that drove the number of major deficiencies to over 100. In the EV Center outbrief, held 5 Sep 07, the Center identified these themes - they include:

- Control Account Managers being assigned at too high a level within the WBS structure (too great a span of control). This was indicated by a general lack of familiarization with basic EVMS processes and a lack of documentation for Work Authorization and Change Control. Inappropriate management techniques were also applied for Material/Subcontract management.
- Processes managed and defined above the level of the control account. This was indicated by a lack of traceability for work authorization to the Control Account and a tendency to generate Change Control and Variance analysis at the WBS level instead of the Control Account Work package level.
- There was a general lack of System Discipline that manifested as a failure to follow processes. This was also indicated by a failure to have adequate integration between the cost and scheduling systems.
- Management Reserve (MR) was also found to be inappropriately used. Budget was used for covering overruns in the Performance Measurement Baseline (PMB) and, in some cases, budget was found to have been inappropriately moved from the PMB to MR (also known as harvesting MR).

The Center anticipates a final report released by mid October 2007. This report will address some of the previous issues identified by DCMA; such as Data Integrity and Offsetting LOE Work packages.

The complete JSF EV Report is attached:

## 10.0 Process Reviews

Process of LM Aero Code 4983 – Producibility Engineering completed. Process was selected primarily due to the historical producibility issues the Wing build area has experienced in the recent past. DCMA met with LM Producibility engineering employees, walked through the documented processes, reviewed examples of producibility issue resolution and preventive actions. No issues or actions were found or taken as a result of the review.

A process review was accomplished on the Build-to-Package Corrective Action Process (BTPCAP). The process is currently adequate and no systemic process problems were noted. Follow-up process reviews will be performed periodically in an effort to discover opportunities for improvement and ensure adequacy.

A review of Program Directive PD-45, the controlling document for the F-35 Variance Request process was performed. PD-45 serves to document the roles and responsibilities associated with the preparation, review, authorization, and implementation of all F-35 requests for Variance. In addition, it documents Lockheed Martins intent to deliver specification compliant items to their customers and ensure that no non-conforming end items are delivered without prior authorization. Overall, it was felt that the contractor has an acceptable system for requesting and controlling Variance Requests via PD-45. However, some areas were noted where improvement could be obtained. A follow-up to the review will be accomplished in October.

F-35 Estimate at Completion (EAC 5) – LM Processes 8.0, 6.0 & AC-2660 reviews were also accomplished during this reporting period. The Development Cost Risk Opportunity Management (DCROM) database was used as the primary tool for data producing purposes during this review. Our focus was on savings as well as cost elements within DCROM which directly affected EAC 5. Other areas of focus included Budget at Completion (BAC) as well as other extraneous factors which contributed to EAC 5's final tabulation. LM's Process 8.0 (Comprehensive Estimate at Completion), Process 6.0 (Revisions and Change Management), and Aero Code-2660 (Development of Estimates at Completion) were decomposed to identify criteria to be used for the review. DCROM's Program Directive should be incorporated within LM Process 6.0, thus further clarifying the necessity of DCMA and JPO's comprehensive understanding of the workings of DCROM. EAC 6 proceedings will be closely monitored to ensure proper adherence by LM to its Processes 8.0 & 6.0 as well as its AC-2660 requirements.

## 11.0 Appendix A

**EV Assessment Criteria** Rating Criteria is based on the DCMA VAC% and when possible should include MR in the DCMA IEAC

█ - VAC% > -5%

Yellow -  $-10\% < \text{VAC}\% < -5\%$

█ - VAC% < -10%

N/R - Not Rated or Not Reported

### **Technical Performance Evaluation Assessment Criteria**

Will the final SDD product satisfy all the major mission requirements?

█ - All TPMs are on track and final production item is predicted to meet the contractual requirements.

Yellow - Some TPMs and/or requirements are currently off track and there is good probability that it will be on track by the end of SDD or it will have no mission impacts.

█ - Product will not meet all requirements, which will result in mission impacts.

N/R – Not Rated or Not Reported

### **Track to First Flights Evaluation Assessment Criteria**

Will the deliveries support the need dates for major events (e.g. ILR, IMR, Power On, First Flight)? Will the delivered product meet the expected quality and maturity?

█ - All products (lab and first flight) deliveries are not in LM Aero's critical path for first flight and delivered product will be of the expected quality and maturity. If there are variances, they will be minor and will not require work-arounds.

Yellow - Product is expected to be delivered late; however, it is not known if it is in LM Aero critical path for first flight and/or delivered product will require workarounds or has traveled work.

█ - Product will be late and is in the critical path for first flight or for the pending deliveries the product will not meet the expected quality and maturity and does not have any known work-arounds.

N/R – Not Rated or Not Reported