



With Brig Gen Carl A. Buhler, Commander, Ogden Air Logistics Complex, Hill Air Force Base, Utah.

Raptors come of age against ISIS...

...and forge a new bond to sustain its fighting spirit into the future.

With: Col Stan Springer, Lt Col Rod Steven, and Col (Ret) Brett Haswell

In the dark skies over Syria on September 22, 2014, the F-22 Raptor joined the ranks of other combat veteran aircraft after unleashing its lethal power in a joint air attack against ISIS targets. First reaching Initial Operational Capability (IOC) in December of 2005, this fifth generation fighter peacefully and confidently defended the skies over our homeland, trained fifth generation fighter pilots and reliably deployed worldwide at the ready to answer an ally's call. Since entering the battlefield arena last fall, theater commander demands for F-22s continue to increase.

With 17 years behind us since the Raptor's first flight, is this fleet postured to sustain the increased OPTEMPO sure to follow in the coming years? Taking stock of today's F-22 challenges reveals a fairly steep climb ahead for this air dominance machine. The fleet currently sits at 59.5% aircraft availability against an Air Force standard of 72.6%. Given the evolving demands of the combat environment today, instead of the planned 50 aircraft not available to fly we'd actually find approximately 73 aircraft unavailable to the Warfighter.



“It's amazing what the airplane can do. While airborne, the F-22 flew its strike mission, but was also re-rolled five times during flight, meaning its main objective changed. The F-22 flew surveillance missions tracking fighters on the ground, used its advanced sensors to redirect other aircraft and call for additional strikes, passed along data on its missions and escorted bombers to their targets. While in flight, the F-22 required seven refuelings.”

General “Hawk” Carlisle, COMACC, ACC commander predicts up to seven-year fight in Iraq, Syria, AF Times, 2 Jun 2015

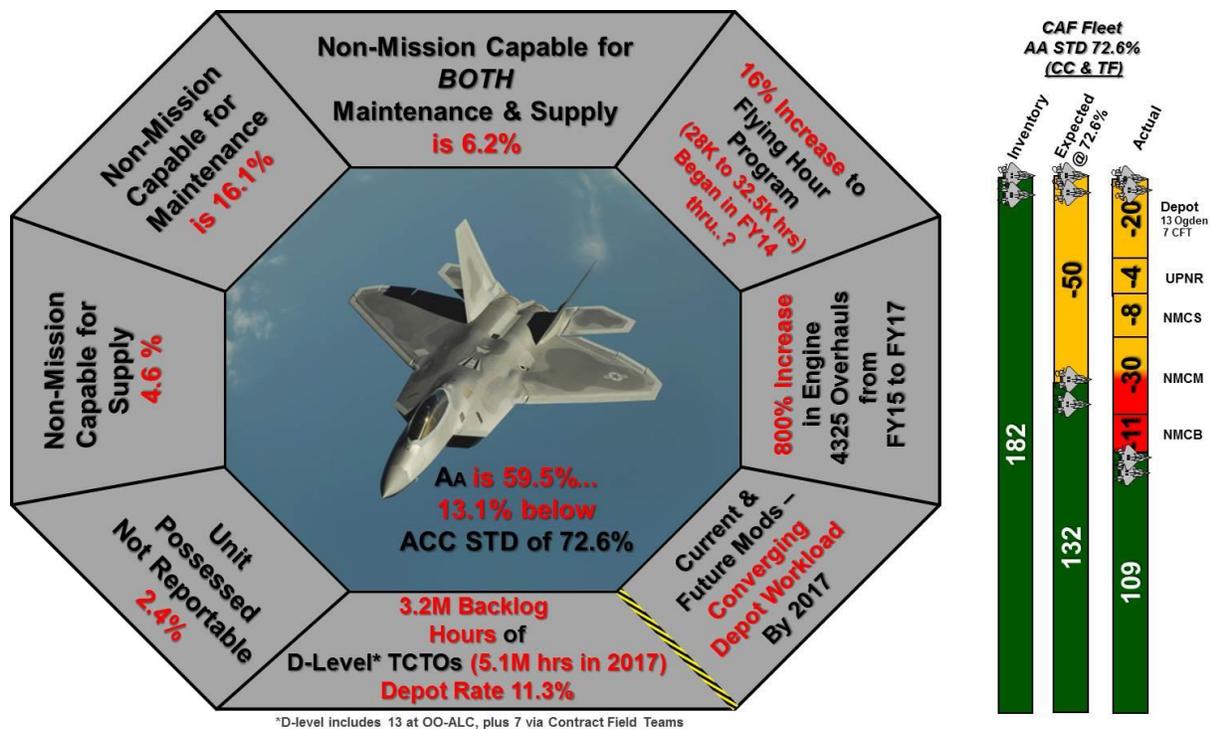
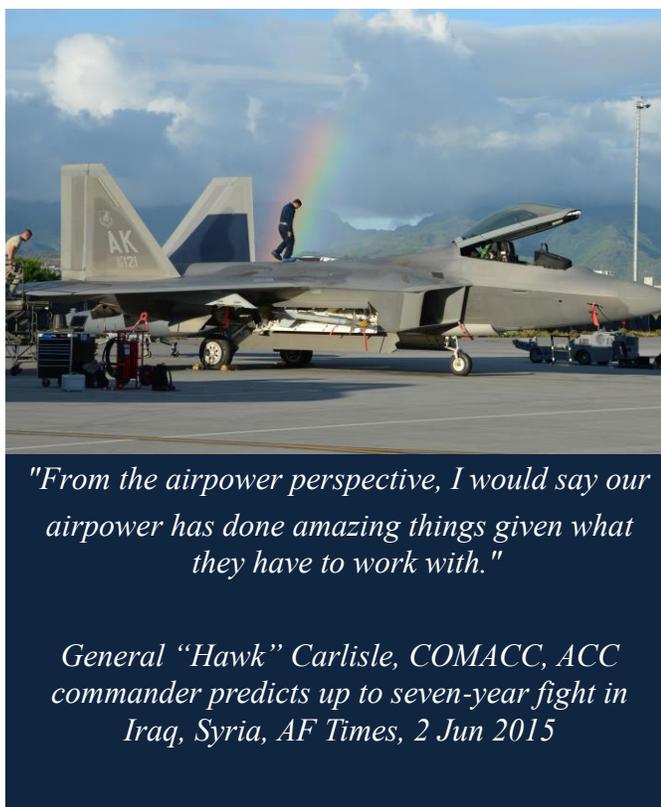


Figure 1: Aircraft availability breakout and fleet impacts

Balance this airframe availability against a 16% growth in the annual flying hour program from roughly 28,000 hours to 35,000 hours and the strain increases yet again. Finally, this relatively small fleet of 187 aircraft is carrying a backlog of over 3.2 million hours of necessary sustainment modifications which is expected to grow to an estimated 5.1 million hours by



FY18. Based on these realities, the F-22 fleet’s viability at its current size appears tenuous if the status quo remains.

Fortunately
for the F-22 fleet,
the Air Force

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Sustainment Center’s (AFSC) approach to achieving “Art of the Possible” results doesn’t include settling for the status quo. Instead, AFSC leaders embrace the “continuous” portion of continuous process improvement and are comfortable with setting tough goals and marching towards them. Always driving for higher velocity within each production line, AFSC tenets are used to focus depot leaders, at all levels, to balance the need for increased speed with the



“Without continual growth and progress, such words as improvement, achievement and success have no meaning.”
Lieutenant General (ret) Bruce Litchfield, the first AFSC/CC, Art of the Possible, 1Sep 2014

requirement to produce a quality asset in a safe manner. The 309th Aircraft Maintenance Group (AMXG) fulfills its mission of delivering airworthy, combat ready aircraft to our Warfighters by keeping a close watch on quality and safety while driving up velocity.

However, overhauling the F-22 fleet requires more than just a single organic depot unit like the 309 AMXG to

deliver on this mission. F-22 depot workloads fall under a Private-Public Partnership (PPP) agreement with Lockheed Martin Aeronautics (LM Aero) that has been in-place for nearly a decade. This PPP brings key players together by working towards a common goal focused on

sustaining the Raptor fleet. Having just shuttered the F-22 portion of LM Aero’s Palmdale facility, the Ogden ALC/LM PPP site remains fully engaged on tackling the myriad of operational challenges outlined above.

Recognizing the perfect storm approaching coupled with the Raptor’s entry in combat ops, Lieutenant General Bruce A. Litchfield (former AFSC/CC) forged a senior leader alliance with Mr. Orlando Carvahlo (Executive VP, LM Aeronautics Business Area) in late September 2014. With an October 2014 change in leadership at the helm of the AF Life Cycle Management

Center
(AFLCMC),
Lieutenant

He challenged the Ogden-LM team to shave 30% from the current depot production line flow by the end of FY16; and the “Road to 30 percent depot flowday reduction” initiative was born.

General John F. Thompson (AFLCMC/CC) enthusiastically joined the alliance. Shortly thereafter, AFSC, AFLCMC, and LM began realigning their collective efforts to transcend previous partnership friction points and focused support on clearing roadblocks and constraints.

Blazing ahead with these leading-edge commitments, the AFSC/CC threw down the gauntlet. He challenged the Ogden-LM team to shave 30% from the current depot production line flow by the end of FY16; and the “Road to 30 percent depot flowday reduction” initiative was born.

This 30% reduction became the F-22’s new Art of the Possible (AoP) goal. Now, the question became, how do we best tackle the challenge?

Fresh from the DoD awarding Ogden’s 574th Aircraft Maintenance Squadron (F-22s) the 2014 Mason Award for best depot maintenance in the Department, the team recognized past successes won’t put the required iron on the ramp. With strong senior leader support, the F-22

Enterprise team of 50-plus stakeholders convened in October 2014 to kick off the first of three major Rapid Improvement Events (RIE). Brigadier General Carl A. Buhler, OO-ALC Commander, charged the team with the following inspiration:

“Focus this entire journey on increasing aircraft availability...that’s the sole measure of merit for this effort. Every team member, to include the VPs and generals, must walk away from this event with action items. That’s the only way to ensure everything is on the table. It will also ensure this effort remains larger than one focused solely at the local level with only tactical actions.”

Now, focused with the end goal in mind, the team “blew up” F-22 depot production by

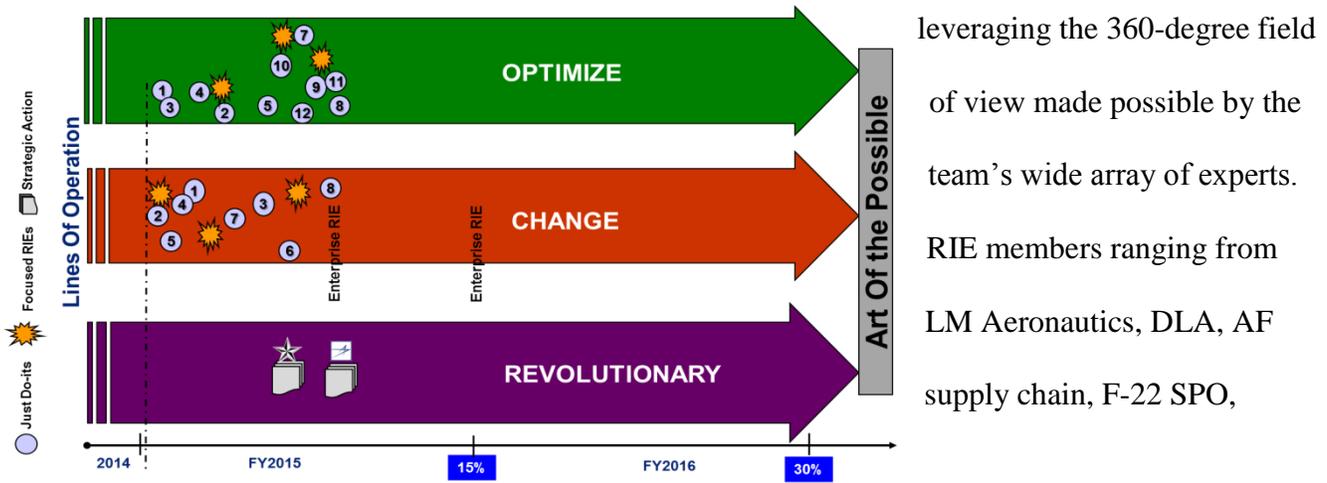


Figure 2: RIE 1.0 Lines of Operation

leveraging the 360-degree field of view made possible by the team’s wide array of experts. RIE members ranging from LM Aeronautics, DLA, AF supply chain, F-22 SPO,

AFSC and OO-ALC fully detailed, then dissected, the F-

22 depot production machines. Viewing the major & minor tasks within an unconstrained support environment, the team crafted a new depot flow approach that could meet the AoP goal...but only if massive changes occurred.

To refine the changes needed, various RIE members fanned out on the production floor and interviewed more than 100 technicians and wage-grade leaders. Gathering 213 inputs, their ideas covered an even broader spectrum to include quality of life, tooling, training and safety-focused thoughts on

streamlining the operation.

The RIE team then focused on the inputs, “bucketized” them into three different categories, and then took the

unique step of providing immediate feedback to the entire workforce before closing down the event. This rare step reflected the value placed on everyone’s

thoughts and reinforced the

leadership team’s commitment to each team member.



“The F-22 Depot Team is a World-Class Partnership with a common goal: reducing depot maintenance spans by 30 percent over the next two years. Achieving this goal will improve aircraft availability across the high demand, low density F-22 fleet,” said Scott Gray, Integrated Fighter Group vice president of sustainment for Lockheed Martin. The 309th Aircraft Maintenance Group, F-22 Program Office, and Lockheed Martin Aeronautics are all working side-by-side to enhance the capabilities and extend the life of the F-22 fleet.”

In wrapping up RIE 1.0 three weeks later, the team settled on 62 distinct opportunities for improvement with 17 of them clearly reflecting immediate, positive impact to the network’s critical path. Outlined in three distinct lines of operation, they named these lines of operation ‘Optimize,’ ‘Change’ and ‘Revolutionary.’ These names helped to identify the level of commitment needed to make necessary changes required to optimize F-22 depot flow and meet the AoP challenge.

For anything in the ‘Optimize’ band, these changes fell largely within the scope of **one organization** to handle. Items in the ‘Change’ line of operation reflected a need for **multiple partners** to tackle the change as a team to achieve success. Finally, the most difficult changes

fell into the

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‘Revolutionary’ line of operation and reflect aspects such formal policy changes, wide-ranging contractual barriers and other items of a like nature. Tackling these issues successfully would require direct engagement by the 3-member team at the **executive level**.

CPI implementation can take a long time to see even a glimmer of success but this team’s enthusiasm blew past that paradigm. Posting clear victories early across every line of operation demonstrate the commitment from the shop floor to the executives’ doors. Out of the ‘Optimize’ band, OO-ALC streamlined internal Low Observable (LO) processes while LM Aero took the lead on solving specific engineering issues identified in the ‘Change’ line of operation. Finally, the SPO accelerated efforts to take a quantum leap forward by driving robotics into the F-22 production line. Let’s look at a detailed example of each.

LO coating restoration on an industrial scale presents challenges rarely seen in the field and fell within the ‘Optimize’ line of operation. Leveraging the wide-ranging capabilities at a USAF depot like OO-ALC can inject a velocity boost simply not available elsewhere. In this case, OO-ALC combined the 309th Commodities Maintenance Group’s Computer Numerically Controlled (CNC) cutting machines to automate a mind-numbing LO boot cutting task. With CNC cutters cranking out standard pieces of LO boot, the 574 AMXS freed dozens of LO

technicians to speed up other LO processes requiring a human touch. Launching from this success, the depot line could now “kit” the LO boot application needs for each aircraft and slash the time team members would have to spend searching for the right parts to finish an LO task.

Through
applying OO-
ALC’s own

With CNC cutters cranking out standard pieces of LO boot, the 574 AMXS freed dozens of LO technicians to speed up other LO processes requiring a human touch.

organic capabilities in new ways, the F-22 team’s made it nearly three-quarters of the way towards the 30 percent AoP goal on the Inlet Coating Repair production machine in less than 6 months!

While the Ogden team focused on streamlining LO work, the LM Aero team led the way towards refining the Supplier Quality Assurance Requirement (SQAR) process for engineering dispositions. Taking anywhere from 3 days to 3 weeks, the SQAR process needed its own overhaul to increase response speed and lessen work-stoppage impacts. The multi-partner nature of this project put this opportunity into the ‘Change’ line of operations since restructuring the

By championing a Standard Depot Repair (SDR) approach, LM Aero eliminated unnecessary wait time for common structural aircraft issues.

process
required
awareness and

support from the many affected organizations. By championing a Standard Depot Repair (SDR) approach, LM Aero eliminated unnecessary wait time for common structural aircraft issues. Conservatively estimated at a 75-day per year savings, this project will continue to yield gains in speed, over the life of the Raptor.

Finally, immediately following RIE 1.0 wrap up, the SPO team redoubled efforts to field a \$12M Small Business Innovation Research (SBIR) project to automate intake coating

processes for the F-22. Falling within the ‘Revolutionary’ line of operation, the SPO secured executive-level support to push this advanced robotics effort to contracting’s forefront. By October 2016, the SPO expects to field three intake robotic paint systems into the main F-22 depot hangar and eliminate at least 50% of the flow days to recoat the intakes. Additionally, this approach frees technician support that was dedicated to two continuous operations spanning more than 60 hours and can now work other tasks or other aircraft, as needed.



“This combined AFSC/AFLCMC/LM initiative to significantly reduce the F-22 depot span is absolutely essential to our collective effort to affordably increase F-22 operational availability. The 30% challenge is an incredible undertaking, and I am counting on the team to continue building on its early successes to simultaneously deliver unprecedented Warfighting capability and operational availability in a cost-effective manner. Our ongoing examination of the F-22's sustainment enterprise builds from the results of this initiative as we continue to look for opportunities to meet the Air Force's most demanding operational requirements in an increasingly austere funding environment”

*Brigadier General Eric T. Fick, Program Executive Officer for Fighters and Bombers,
Air Force Life Cycle Management Center*

As a testament to the commitment of this re-forged partnership, the same stakeholders reconvened in April 2015 for RIE 2.0 with the goal of identifying emerging friction points

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generated by
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speed. A total

of 104 opportunities for refinement emerged and the team agreed to an additional reduction of 34 flow days across the depot lines. With the commitment holding strong, a June 2015 RIE 2.5 focused on exchangeables recently wrapped up finding more changes to test out in the supply and commodities arenas. Although the final tally for FY15 will come at the end of the year, the F-22 team has already dropped 38 total flow days on this year's total goal of 79 with two inlet coating repair (ICR) jets already meeting the 30% goal.

As our F-22 Partnership and the associated support systems evolve, this dedicated team will surely burn down the backlog and deliver more iron back to F-22 flightlines. After overcoming these hurdles, the F-22 depot team looks forward to adding more features and Warfighting capabilities to the newest combat-proven airframe. The question remains...just *how much* combat capability can this invigorated team return to the combatant commanders?

Brigadier General Buhler addressed how we'll answer this question as he provided guidance to the team before the kickoff for the F-22 RIE 2.5 effort with the following thoughts... "By following the three lines of operations laid out in RIE 1.0, **this** combined team will 'Optimize,' 'Change' and 'Revolutionize' F-22 operations for our nation. Our unified efforts between LM, the SPO, Supply Chain, Engineering, Maintenance and all other contributors provide the solid foundation to propel combat training sustainment forward. Although seemingly disconnected at times, we're all pulling towards that common goal at the center of

AFSC's leadership model; increasing aircraft availability through achieving the depot's Art of the Possible Goal."

With a dedicated, *Enterprise* approach, the three F-22 partners will have the tools to achieve Art of the Possible objectives previously unobtainable in our resource-constrained environment.

ABOUT THE AUTHOR:

Brig Gen Carl A. Buhler is the Commander, Ogden Air Logistics Complex, Hill Air Force Base, Utah. As commander, he leads a team of approximately 8,100 personnel to perform depot repair, overhaul, and modification of the A-10, C-130, F-16, F-22, F-35 and T-38 aircraft, the Minuteman intercontinental ballistic missile system, and a wide range of commodities."