



ABL FOCUS



January/February 1998

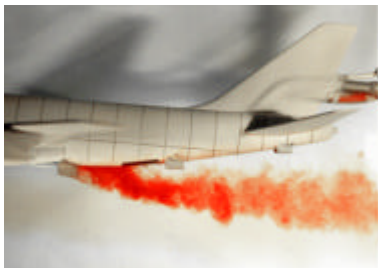
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WIND TUNNEL TEST UPDATE

The first wind tunnel test of the Airborne Laser ended in December. The testing explored the impact of the nose turret and the laser exhaust system.

The air flow around and behind the turret was mapped out using advanced flow field sensors and pressure transducers. The turret tests showed that incorporating simple design changes delivered both weight and drag savings.

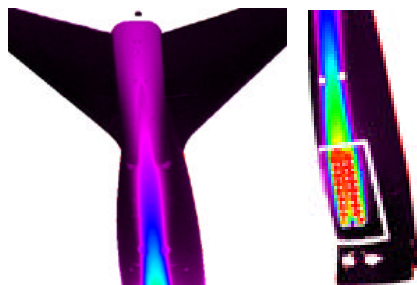
The aerodynamics of the laser exhaust system were also explored. Tests of several configurations confirmed the ability to eliminate exhaust impingement on the fuselage as a major issue. By using a combination of techniques, we tracked where the exhaust was impinging on the aft body, and readily determined the impact of such modifications as vortex generators, doors, and ventral planes. One very positive outcome was the excellent correlation seen between water tunnel and wind tunnel flow visualization data. Analyses of the data are underway and should be wrapped up in February.



Water tunnel data shows elimination of impingement on the aft fuselage.

A significant highlight of the testing has been Boeing's ability to tap in-house expertise. For the turret tests, Boeing brought up the Rockwell engineer that developed the alternate design. Flow visualization experts from St. Louis applied their pressure-sensitive paint to

the fuselage to reveal how the exhaust flow was impinging. Not least were the experienced aerodynamicists and technicians available during the entire test process.



Wind tunnel results using pressure sensitive paint confirm water tunnel data.

TEAM ABL LEADS THE WAY (AGAIN)!

Thanks to the Contracting Division, Defense Contract Management Command (DCMC) and Defense Finance and Accounting Service (DFAS), Team ABL made USAF history in January by making electronic payment to Boeing Commercial Airplane Group for the "green" aircraft without a paper invoice. After coordination with DCMC and DFAS, Mary Jackson, ABL Contracting Division Chief, developed a process that allows payments for the commercial aircraft on a pre-established payment schedule on the dates due without any additional

paperwork. On 5 Jan 98, the USAF placed an order for a Boeing 747-400F freighter aircraft for approximately \$144 million with an initial down payment of \$8.7 million.

Colonel Booen lauded this remarkable achievement, saying "This is a significant business milestone. Until now, the Defense Department has only been able to make payments based on invoices submitted by a defense contractor. But the ABL Program, in addition to developing a revolutionary weapon system, has been charged to look at ways that will improve Defense procurement practices." Future programs involving commercial items will benefit from this pilot program.

SCIENTIFIC ADVISORY BOARD STUDIES FOCUS ON ABL

LGen Muellner chartered two groups from the AF Scientific Advisory Board (SAB) to study ABL. The SAB Red Team, examining the ABL Concept of Operations (CONOPS,) recently concluded its review of ABL with an outbrief to LGen Muellner on 9 Jan. The team went beyond the current draft ACC CONOPS document and recommended ACC and the SPO establish thorough conclusions on how the ABL weapon system will be employed. Specific emphasis was placed on integrating ABL into the joint TMD Family of Systems. The Red Team will convene again in April to review progress.

The second group is the SAB study on ABL atmospheric, chaired by Mr. Jack Welch, former SAF/AQ. This group's task is to review the SPO's worldwide atmospheric data gathering and analysis campaign, and reconcile this with different views of atmospheric turbulence held by OSD/PA&E and the Institute for Defense Analysis (IDA). Outbrief will go to LtGen Muellner to support Congressional testimony by Gen Ryan on 11 Feb.

TMD SYMPOSIUM

The Institute for Foreign Policy Analysis, Inc. sponsored a symposium 22-23 Jan on Exploring Future US Missile Defense Requirements: *Where Are We and Where Do We Need to Go?* Representatives from several congressional committees, think tanks, BMDO, and complementary programs were in attendance. Col Booen and Paul Shennum presented an ABL briefing stressing the dissimilar technologies and the benefits of boost phase intercept. This briefing was well-received.

QUARTERLY DESIGN REVIEW #3

The third ABL Quarterly Design Review (QDR-3) was held at Boeing 8-12 Dec. QDRs provide a forum for detailed IPT and AIT status and crossflow of system design issues. QDR-3 provided a snapshot of the design progress and demonstrated the ABL program is on track for the Preliminary Design Review (PDR) scheduled for Apr 98.

ADJUNCT MISSIONS STUDY

The SPO held a kick-off meeting on 22 Jan with Boeing and Logicon for the Phase II Adjunct Missions Study. The focus of

this study is on building upon Phase I results with increased realism, especially for imaging. Boeing will produce the final report 1Q FY99 with ROM costs of proposed modifications and impacts to the primary design or mission.

ACTING SECRETARY OF THE AIR FORCE VISITS SPO

Acting Secretary of the Air Force F. Whitten Peters visited the Airborne Laser System Program Office on 14 Jan 98. Col Booen and members of the SPO briefed Mr. Peters on the complexities of the program and its importance to the future of theater missile defense. Increasing the Acting Secretary's awareness of the ABL program is an important step in preparation for Congressional budget hearings. When asked about his perception of the ABL program, Mr Peters commented that ". . . It's one of our key programs that we want to keep funded in our budget."



Col Gary Dills, Base Commander, as well as representatives from the Air Force Research Laboratory, attended the briefings. Later in the evening, Mr. Peters visited the Starfire Optical Range (SOR) and was treated to a first-

hand demonstration of atmospheric compensation.

RISK REDUCTION EFFORTS

TURRET WINDOW

The full scale turret window manufacturing process is going well and on-schedule, and the subscale version has been successfully completed. The subscale turret window provided essential risk reduction in the processing and handling of the material at both Heraeus and Corning. Meanwhile the full scale manufacturing of turret window #1 successfully completed the first of three material flow outs at the Heraeus Amersil Oyster facility in Duluth, Georgia. The manufacturing involves the processing of very low absorption fused quartz material by Heraeus in Germany, and the flow out of a 0.6m diameter pole of glass into a 1.1m diameter boule in Duluth, Georgia. This boule, as well as two more similar boules, will be shipped to Corning, NY to begin processing into the 1.75 m diameter turret window.

BEAM CONTROL

The subscale deformable mirrors have been completed and were tested at MIT Lincoln Laboratory on 20 Jan. Both mirrors, one from Xinetics and the other from HDOS, performed well. The next step in this risk reduction effort is to coat the mirrors with the very low absorption coating. The coating will occur sometime in mid-February. After coating, the mirrors will be characterized and exposed to COIL radiation at the Phillips Research Center.

EBCCD CAMERA

The first prototype Electron Bombarded Charged Coupled Diode camera was delivered to Lockheed the beginning of this year. The manufacturing techniques for these sensors was greatly improved during the course of this effort. This first camera is being evaluated at Lockheed for performance.

FLM STATUS

The flight weighted laser module (FLM) integration effort has made substantial progress. The FLM diffuser was integrated into the facility and the heat exchanger has been integrated into the FLM plumbing. The basic hydrogen peroxide (BHP) cover plate was delivered on schedule and put in place for a fit check before being sent back to the vendor to be mated with the injector plates. With the cover plate fit check complete, installation of the BHP and hydrogen peroxide plumbing began.

ATMOSPHERIC CHARACTERIZATION and PERFORMANCE WORKING GROUPS

The Atmospheric Characterization Working Group (ACWG) and Performance Working Group (PWG) were held on 15-16 Dec. The ACWG reviewed the summer data and various proposed methodologies for calculating equivalent turbulence strength over long paths from the data. The PWG reviewed the models used by the SPO and prime contractor to predict the performance of the system and the validation analyses which have been accomplished to anchor these models. The next round of working group meetings is scheduled for the end of February.

LETHALITY WORKING GROUP

The ABL SPO hosted the Lethality Working Group on 17 Dec at the Phillips Research Conference Center. Representatives from the SPO, AFRL, USD (A&T), AFPEO, AFOTEC, DIA, and industry received briefings and held discussions on the following topics: Intelligence Updates, Testing Status, Materials Interaction Update, Target Structural Response, Lethality Assessment Results, Foreign Material Exploitation, and Upcoming Activities.

INTELLIGENCE SUPPORT WORKING GROUP

The ABL Intelligence Support Working Group met on 3-4 Dec. Attendees included the SPO, Boeing, ACC, 497IG, AFSPC, ESC, AIA, and AFRL. Briefings were given by AIA on the Real Time Information to the cockpit program and by AFSPC on predictive avoidance. The second day was spent reviewing Intelligence Support Plan Chapter 3, Derived Intelligence Requirements. The ISP will go through the approval cycle 2Q FY98.

BRIEFING THE VIPs

- Gen Ryan was given a program overview, followed by an outbrief of the SAB red team.
- SASC staffers Eric Thoemmes and Steve Madey were briefed on the ABL program status.
- CBO staffers David Mosher and Jeffery Fordan were given a program update.
- Gen Hawley was given a program status and summary of the weight management plan.
- HNSC staffer Steve Ansley was briefed on the ABL program.
- Congressman Norm Dicks was given an ABL overview briefing.
- Col(s) Kevin Burns (SAF/AQPT), Col Ron Kurjanowicz (HQ USAF/XORFS), and Col Al Peck (HQ USAF/XPPA) were briefed on the ABL program status.