



OFFICE OF THE SECRETARY OF DEFENSE
DIRECTOR, PLANNING AND EVALUATION

WASHINGTON, D. C. 20301

July 22, 1976

MEMORANDUM FOR MR CHRISTIE *TPC*

SUBJECT: Trip Report to Miramar and Nellis

● On 12 and 13 Jul 76 we visited Miramar NAS. Briefed on Topgun and the ACMR by Topgun CO Jim Ruffison and Lt Darrell Gary. No surprises concerning tactics and maneuvers in Air-to-Air. However, the briefers and others pointed out that small size is very important in A-to-A (mock) (or real) combat. While this was not surprising, per se, the strong (extreme!) emphasis suggests that the corporate OSD, Navy, and AF bodies have not given this feature (together with the advantage of numbers) appropriate attention in the trade-offs or decisions leading to new fighters - F-14 and F-15 being notable examples.

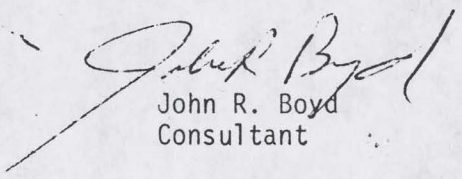
● VF-124 officers were "gung ho" concerning the F-14. However, representatives did suggest they could use more thrust. Also, they recognized that a large silhouette-compared to F-5 and like aircraft - did not make things easier for them. The Navy is also convinced that a two-man crew is needed although emphasis here was not stressed to the same extent, or degree, in comparison to small size. (Naturally, less emphasis here can be attributed to Navy possession of two-crew member aircraft)

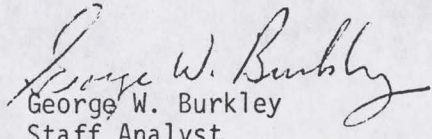
● At Nellis on 14 and 15 July we were briefed on ACMI together with AIMVAL/ACEVAL and Red Flag. Also had a lengthy discussion with members of the 64th Aggressor Squadron. ACMI display facility and briefing were impressive. Briefer indicated ACMI is just a tuned-up or later version of ACMR. On the briefing regarding AIMVAL/ACEVAL it was pointed out in order to keep the number of sorties from becoming impossibly (and expensive) large AIMVAL/ACEVAL testing is being set up at the 80% confidence level. The briefing generally followed the concept and rationale depicted in the planning report. Initially, the AIMVAL/ACEVAL people seemed a bit defensive toward our presence but settled down and outlined what AIMVAL/ACEVAL is and where it is heading. On the briefing regarding Redflag it was described as an exercise wherein typical AF air assets (fighters, Recce, transport etc.) were employed in an integrated effort to execute preassigned missions in a



mock 10 day war - that includes active mock aggressor forces (including air and surface-to-air). Purpose of this effort is at least two-fold: 1) Provide realistic training and 2) explore the feasibility of employing contemporary and new tactics (that can be recommended and evaluated by the participants) against a perceived threat in a free play environment. Fortunately, we were afforded the opportunity to observe a debrief by all participants - "good guys and bad guys". During debrief it became quickly apparent that the purpose of Redflag operations was being realized to a much greater extent than normally expected. In this context, the contribution and morale of the participants could not be higher - which is consistent with minimum interference from outside bureaucratic agencies. However, a note of caution and concern was expressed by a participant when he pointed out that he became overly cautious in the tactics he selected due to the presence of an Inspector General (IG) representative included in his flight. As a result of briefings, debriefings and many discussions with participants we recommend that Redflag operations be supported and that participation from outside bureaucratic "helpers" be discouraged. In other words, keep out those agencies - such as IG, ORI, - that apply unnecessary control etc. that will destroy the benefits that are now emerging from Redflag operations.

● Also while at Nellis Mr. Boyd had the opportunity to discuss tactics etc. with the 64th Aggressor Squadron. Like the Navy people they pointed out that small size is an important commodity. Also they pointed out (as did the Navy) that concentrated training is vital for superiority in Air-to-Air Combat. During this Aggressor Squadron visit Mr. Boyd briefed some of the officers on a new conception of Air-to-Air Combat and its anticipated impact upon operational and technical considerations. The briefing was also given to Dr. Oberle at Miramar. The response from both Dr. Oberle and members of the Aggressor Squadron was enthusiastic.


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29 December 1977

PROGRAM ANALYSIS
AND EVALUATION
DASD (OT&E)

MEMORANDUM FOR MR. MURRAY

THRU:

~~MR. CHRISTIE~~ TPC

SUBJECT: Trip Report of John Boyd and LtCol Burkley to Nellis AFB

On 7, 8, and 9 December 1977 we visited Nellis AFB to be updated on the AIMVAL/ACEVAL and Red Flag efforts. This was a follow-up visit to the one we made during July 1976 (trip report attached). The purpose of the visit was to discuss the results of the AIMVAL/ACEVAL test with the air crew that participated and to evaluate the progress and utility of the Red Flag training exercises.

The AIMVAL/ACEVAL discussions were most interesting and illuminating. The opportunity to spend considerable time with the personnel that flew and analyzed the evaluation provided a great deal of insight that cannot be captured or expressed by a "traveling road show" briefing team. Many of the nuances that came out during our discussion indicated that uninformed observers and/or analysts could easily arrive at significantly different conclusions and may grossly misinterpret the collected data.

In fact, it became apparent that many historically accepted analytical techniques used alone would provide only a narrow, shallow view leading to distorted results and are inadequate to describe the meaning of the data. A multi-reference analysis appears mandatory to provide a balanced appreciation. The Braddock Dunn and McDonald (BDM) on site analysis team (that was assisting the Joint Test Force (JTF)) has attempted to develop a methodology to address the complexity of the data. They were planning to present their methodology to the Military Operations Research Society (MORS) conference in December at Monterey. The reaction of the analysis community to their presentation should be most interesting.

Our discussions with the air crews that flew in the evaluations were most revealing. Many very different opinions were expressed by the personnel involved and it appeared that one could find support for any conclusion or point of view depending upon whom you questioned. The overriding concern expressed by most was that the results of the AIMVAL/ACEVAL evaluations will be incorrectly interpreted and used to support weapon systems concepts reflecting industry's desires and not operational needs.

The personnel involved in these evaluations were carefully screened before selection and were considered the experts in their fields. The air crew were the best the operational forces could offer and by the time that AIMVAL commenced were probably the best trained crews in the world. Even starting at this high level of training and readiness, the crews reported that a significant learning curve was experienced and, in fact, the tactics changed continuously. Therefore, it took a day-to-day involvement to even keep up. This points out one of the major conclusions. In a free play environment, tactics must be flexible and aircrew prepared to rapidly adapt to accommodate change. In this context, the crews reported that they had to, and in fact did, exploit weapon system weaknesses as well as any split second tactical weakness or mistakes displayed by their adversary. Furthermore, they indicated that offensive and defensive tactics must be continually varied to remain unpredictable and confuse adversaries. Additionally, they indicated that since winning was the all important driver, they used every bit of information available to "game" the system. This had an adverse effect of permitting the crew to develop and use tactics that applied to specific AIMVAL/ACEVAL engagements and in general could not be extrapolated to any real world conflict. For example, in most of the engagements, the crews were completely aware of the size and location of all adversaries. This revealed sanctuaries for retreat (they call it "Bug-out"). Lookout and scan tactics would have been very different and sanctuaries would not have existed, had "wild cards" been included and had ACMI constraints not been imposed.

The use of ground controlled intercept (GCI) controller revealed some interesting problems. As part of the "gaming" that the crews worked out, they found that the GCI controller could provide assistance throughout the engagements, and could, if permitted, direct the tactics to produce wins. This worked quite well for the engagements where small numbers of aircraft were involved but as the number of airplanes in the engagement increased the GCI operators and communications nets became saturated and could not cope. In such situations the engagements tended to degenerate into an every man for himself in a one vs many environment. Also the increased confusion generated by numbers and related communication saturation appeared to decrease the utility of the two man crew concept and the value of the sophisticated weapon system.

The impact of having a numerical advantage over an adversary appeared to be a major parameter that would shape the outcome of the many vs many engagements when force sizes were known and wildcards were not introduced. The desire and importance for a small aircraft signature in all spectrums was emphasized. The participants also focused on the importance of agility in weapon systems, and tactics. All agreed that what is needed are systems that provide the ability to detect, identify, point, shoot and extend more quickly than an adversary. However, while speed seemed important, one adverse comment concerning speed was voiced. It seems that increased speed tended to increase the IR signature and from that point of view may not be desirable.

Training is another important parameter to consider. While most agreed that the complex weapon systems provided more tactical options, it took longer for the aircrew to learn how to properly operate and employ these systems. It was interesting to note that just before the evaluation commenced, the Red force was short two pilots. The decision was made to use two engineers from the JTF's staff, who happened to be pilots, to fill these vacancies. Neither individual was trained in the F-5, however, one of the two turned out to be one of the winningest pilots on the Red force and the other did as well as the hand selected crews. This emphasizes that training to a high proficiency level can be accomplished quickly given relatively simple systems.

In summary, our perceptions of AIMVAL/ACEVAL have led us to the following conclusions:

- Multi reference analysis required to appreciate the data.
- Specific tactics and their results developed during these evaluations may not extrapolate to "real world" engagement.
- Specific results of evaluation are not as important as general indicators.
- Ability to quickly adapt and evolve tactics is crucial to exploit weaknesses in adversary weapons system and to counter his evolving tactics.
- Having numerical superiority provided an advantage.
- Small signature in all spectrums is important.
- Agility of our weapon systems and tactics influence outcomes, i.e., the ability to detect, identify, point, shoot, and extend before or better than an adversary.
- GCI good for small numbers however operators and communications may not cope during many vs many engagements.
- Training required is directly related to complexity and sophistication.
- Value of tactical options provided by complex systems tends to wash out in a many vs many environment.

Red Flag

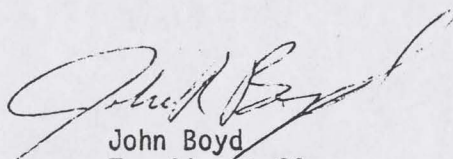
During our visit we also attended a "Mass Debrief" of an ongoing Red Flag training exercise. This particular Red Flag included both day night operations and involved a large number of organizations. Many different capabilities were exercised. Included were units from most

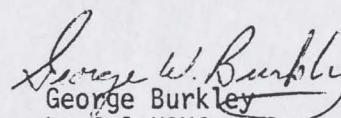
major Air Force commands and the Marine Corps. There were combat air patrols, fighter sweeps, escort fighters, interdiction missions (day and night), clandestine inserts and extractions, forward air controllers and AC-130 gun ships. All participants were exercised in a simulated threat environment and assigned missions selected to emphasize specific weapon system capabilities.

The personnel participating displayed a very high level of morale and enthusiasm. The management of the Red Flag operation appeared exceptional. It is our opinion that the Red Flag effort provides one of the greatest returns toward realistic training. A very valuable feature of the Red Flag exercises is that they permit the participating crews to develop and evaluate their own tactics without outside bureaucratic "help" such as IG, ORI, and Stan Eval.

We have one concern about the current Red Flag operation. Perceptions of the simulated threat are tending to drive the aircrew to operate at very low altitudes (under 100 ft). This may be O.K. in a relatively small arms and AAA free environment where the major threats are SAMs. However, history has shown that there can be a "wall of steel" at low altitudes. The Red Flag designers should try and factor this into the scenario to expand the tactical options evaluated by the participants.

We asked for the video tape of the debrief that we attended. Recommend that you take the 1.5 hours it would take to review the tape. In our opinion it provides an excellent feel for current fleet operational capabilities and limitations. The crews tell it like it is in the debriefs.


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USN NOP-50
USAF X00
USMC MC-A
USMC MC-A & RP (2 cys)

INCREASING WEAPONS AND OPERATIONAL COMPLEXITY:

- Impedes Modernization and Adaptability
- Reduces Readiness
- Dooms Rescue Operations