Executive Summary
STOVL/Strike Fighter Replacement A/C in the 2010 Time Frame

(U) The Naval Research Advisory Committee (NRAC) Panel on the Short Take-Off Vertical Landing (STOVL) Strike Fighter (SSF) was tasked to review related past and current STOVL activities and to project the future technology potential of SSF-related items to determine the feasibility of an SSF aircraft that could be fielded in the year 2010-2020 time frame. In addition, the Panel was asked to compare the projected SSF capability to current and planned Conventional Take-Off and Landing (CTOL) aircraft, and to determine if the SSF could deal with the Third World threat of that time period.

(U) In examining the current and projected threat that could impact the design of a Tactical Air (TACAIR) Strike/Fighter, the Panel determined that the resulting aircraft would have to be survivable against the Anti-Air Warfare (AAW) threats (air-to-air and surface-to-air) now being developed and exported to the Third World. The likelihood is that the economic conditions over the next 20 years will accelerate distribution of these capabilities to the Third World. There is even evidence that Third World nations are funding the development process for some weapons, e.g. New Generation French Electro-Optical (EO) Low Altitude Surface-to-Air Missile (SAM) (CROTALE NG). To be effective and survivable in 2010-2020, SSF will require a high degree of maneuverability, a low Radar Cross Section (RCS), and a low Infrared (IR) signature.

(U) In examining the seven missions for an SSF [Deck Launched Intercept (DLI), Interdiction, Strike, Combat Air Patrol/Air Defense (CAP/AD), Reconnaissance (RECCE), Close Air Support (CAS), and Suppression of Enemy Air Defense (SEAD)], the Panel felt that all missions can be met with a target empty weight of 24,000 pounds. Projecting today's technologies to 2010 provided the Panel with confidence that a rigorously managed program would result in a successful aircraft design. The highest technical priority was placed on continued engine growth [Integrated High Performance Turbine Engine Technology (IPHTET) Program] and the ability to generate increased thrust at lower engine weights while maintaining a 2000 hour life cycle. Other enabling technologies include: low weight, high strength, low RCS materials; avionics capable of providing all weather, day and night operations and situational awareness for no more than 2000 pounds of installed weight; and a fully integrated flight/propulsion control system. In reviewing AV-8B history, the Panel concluded that the US Navy (USN) and its contractors are capable of focusing on weight as a major issue if there is a catastrophic design impact caused by weight growth. In a STOVL design, the impact of weight growth is directly felt in Short Take-Off distance for a given mission and engine capability. This led the Panel to conclude that the weight could be controlled (within 2 1/2% of the design requirement) which would allow the unit recurring fly-away cost of the aircraft to be no more than $27M (FY92 dollars), based on empirical data that USN aircraft cost approximately $1.1K per pound of empty weight.

(U) The Panel also made an attempt to assess the operational need for an SSF by the US Marine Corps (USMC), USN, and US Air Force (USAF). The Panel concluded that an SSF-type capability provided significant war fighting advantages to the USMC; and that if an SSF was not funded, AV-8B retirement would severely reduce the USMC's war fighting capability. Basing flexibility (shorter transit times to the target), increased sortie rates, and full capability for the seven missions are prime advantages the SSF would bring to the USMC's ability to overwhelm a Third World adversary. In the USN's case the flexibility to utilize an SSF off smaller ships, to put more SSFs than mission-equivalent CTOLs on the larger carriers, and to change the methodology of carrier operations to increase sortie rates were all thought to provide measurable gains in war fighting capability. The significance of these advantages is related to the USN's Power Projection Role and the make-up of the projected carrier force after the year 2000.

(U) While the USAF requirement for a Multi-Role Fighter (MRF) does not focus on STOVL capability, the Panel believes that the USAF could benefit from an airframe, engine, and avionics common with the SSF even if they do not embrace a STOVL capability for operating from damaged runways and under austere basing situations. In addition, there is considerable value to the Department of Defense (DoD) in having a common tactical air, low-end aircraft design in the 2010 time frame.

(U) In summary, the Panel strongly believes that now is the time to pursue SSF enabling technologies. There is high likelihood they could evolve into an SSF aircraft design that could provide a substantial enhancement in war fighting capability at an affordable cost in the 2010-2020 time frame. The Panel's "roadmap" to the fleet favors a STOVL Technology Demonstration Program for the Airframe and Engine and concurrent Avionics and Survivability Programs that culminate in a major decision point in the year 2001 to determine if SSF should proceed to Demonstration/Validation (DEM/VAL) and Engineering and Manufacturing Development (EMD). It should be noted that if the decision is to proceed, then the USMC can begin to replace the AV-8s in the year 2010; should the SSF DEM/VAL and EMD decision be negative, the technology gained can be employed to enhance currently planned CTOL aircraft or a new CTOL aircraft. This SSF program plan has the following advantages:

(U)(a) Substantive risk reduction will be accomplished prior to DEM/VAL.

(U)(b) Research and Development (R&D) funding levels will remain minimal during the F-18 E/F and Medium Attack Aircraft-Experimental (AX) development process.

(U)(c) Procurement funding will not be required until after most F-18 E/Fs have been procured.

(U)(d) The Department of Navy (DoN) would not be committed to the SSF until the threat and the USN mission have been further refined at the turn of the century.

(U)(e) The SSF could be introduced into the USMC first, followed by the USN and the USAF on a "waterfall" basis.

(U) It is important to recognize that the SSF technology demonstration program should be initiated by FY 93 to permit development of an SSF which would begin operations in

2010. Additionally, there are missing critical elements in ongoing DoD avionics technology programs which should also be funded in the FY 93-95 time frame.

(U) In the end, the Panel believes that this SSF roadmap outlines a path that allows the USN and USMC to remain capable of employing advanced technology to overwhelm a Third World adversary well beyond the year 2020.