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NEED TO MAXIMIZE RPV USE WHERE SUITED TO SAVE LIVES AND DOLLARS

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I AM PLEASED TO BE HERE TODAY TO DISCUSS THE RECENT GENERAL ACCOUNTING OFFICE REPORT TITLED "DOD'S USE OF REMOTELY PILOTED VEHICLE TECHNOLOGY OFFERS OPPORTUNITIES FOR SAVING LIVES AND DOLLARS." THIS STUDY WAS UNDERTAKEN TO EXAMINE THE

--STATUS OF RPV TECHNOLOGY

--REASONS FOR ITS APPARENT LIMITED APPLICATION BY DOD, AND

--THE POTENTIAL FOR USING RPV'S IN NONMILITARY APPLICATIONS

OUR STUDY WAS NOT A TECHNICAL EVALUATION OF CURRENT RPV DEVELOPMENT PROGRAMS, BUT FOCUSED ON THE VIEWS OF MILITARY AND CIVILIAN EXPERTS WITHIN THE RPV COMMUNITY AS TO THE FEASIBILITY AND POTENTIAL OF GREATER USES OF THIS TECHNOLOGY.

SCOPE AND METHODOLOGY OF GAO STUDY

WE OBTAINED INFORMATION FOR THE STUDY FROM DOD, CIVIL AGENCIES, THE ASSOCIATION FOR UNMANNED VEHICLE SYSTEMS (AUVS), GOVERNMENT DATA BANKS, AND SOME AVIATION ORGANIZATIONS. A QUESTIONNAIRE WAS USED TO RECORD EXPERT VIEWS ON THE FEASIBILITY, ADVANTAGES, AND DRAWBACKS OF MORE WIDESPREAD USE OF RPVS. WE SENT THE QUESTIONNAIRE TO 85 PEOPLE EXPERIENCED IN THE RPV FIELD, MOST OF WHOM WERE IDENTIFIED THROUGH THEIR MEMBERSHIP IN THE AUVS. THE RESPONSE RATE WAS ABOUT 90 PERCENT. WHILE IT IS RECOGNIZED THAT THE EXPERT VIEWS WOULD NOT NECESSARILY BE REPRESENTATIVE OF THE ENTIRE RPV COMMUNITY OR BE AN UNBIASED FORUM OF VIEWS, IT DID CONSTITUTE, WHEN AGGREGATED

WITH THE OTHER INFORMATION WE GATHERED, A KNOWLEDGEABLE BASE OF INFORMATION ON AVAILABLE TECHNOLOGY AND THE BARRIERS TO RPV USE.

RPV TECHNOLOGY - BARRIERS EXIST TO ITS USE BUT LACK OF UTILIZATION IS LINKED TO OTHER FACTORS TO LARGE EXTENT

ALL NEW TECHNOLOGIES FACE VARIOUS BARRIERS OR OBSTACLES TO THEIR UTILIZATION. SOME RELATE DIRECTLY TO THE TECHNICAL PROBLEMS AND OTHERS TO ECONOMIC, REGULATORY, OR EVEN SOCIAL FACTORS. IN THE CASE OF RPV TECHNOLOGY, OUR SURVEY OF THE EXPERTS FOUND THAT THE STATE-OF-THE-ART WAS NOT VIEWED AS A MAJOR BARRIER TO USING RPVS AS AN ALTERNATIVE TO MANNED AIRCRAFT IN MANY SITUATIONS. RECOVERY TECHNOLOGY WAS CONCLUDED TO BE THE MOST SIGNIFICANT TECHNICAL BARRIER TO THE USE OF RPVS. NON-TECHNICAL MATTERS SUCH AS AIRSPACE SAFETY AND GOVERNMENT REGULATIONS ON RPV OPERATIONS, ESPECIALLY FOR CIVIL APPLICATIONS, WERE VIEWED AS MODERATELY SEVERE BARRIERS. THERE WAS GENERAL AGREEMENT THAT TECHNICAL LIMITATIONS WHICH NOW EXIST, COULD BE SOLVED IF A REAL INTEREST IN RPV'S WAS TO DEVELOP. (FIG. 1, P. 11.)

WE ASKED THE RESPONDENTS TO EVALUATE THE FACTORS WHICH ACCOUNT FOR THE LACK OF WIDESPREAD USE OF RPV TECHNOLOGY. MOST EXPERTS RANKED USER APATHY AS THE MOST IMPORTANT REASON. PERCEIVED AS BEING OF MODERATE IMPORTANCE WERE THE INTERRELATED FACTORS OF USER UNAWARENESS AND WEAK MARKET FORECASTS. RPVS APPEAR TO SUFFER FROM USER ATTITUDES TO A GREATER EXTENT THAN FROM TECHNICAL BARRIERS. (FIG. 2, P. 12.)

RPVS OFFER SOME SIGNIFICANT ADVANTAGES OVER MANNED AIRCRAFT

ACCORDING TO THE EXPERTS SURVEYED, THE MOST IMPORTANT FACTORS BEHIND THE LIMITED USE OF RPVS BY THE MILITARY SERVICES ARE USER RELUCTANCE AND A LACK OF FUNDING SUPPORT.

IN EXPLAINING THE HISTORY OF RPVS, AN AIR FORCE STUDY GROUP STATED IN A 1974 REPORT THAT, HISTORICALLY, RPV/DRONE PROGRAMS HAD BEEN CHARACTERIZED BY QUICK REACTION TO URGENT NATIONAL PRIORITIES AND NEEDS, SPECIALIZED MANAGEMENT PROCEDURES, AND CAPABILITY ADVANCEMENT BY IMPROVEMENT AND MODIFICATION TO EXISTING VEHICLES AND EQUIPMENT. THAT REPORT ALSO CONCLUDED THAT THE EMERGENCE OF RPV/DRONES AS SERIOUS WEAPON SYSTEM CANDIDATES IN OUR DEFENSE POSTURE WAS SPURRED ON BY THEIR SUCCESSFUL USE IN SOUTHEAST ASIA, AN ADVANCED TECHNOLOGY BASE, DRAMATIC IMPROVEMENTS IN SOVIET DEFENSES, AND A COINCIDENT SEARCH FOR LESS COSTLY SYSTEMS. AT THE TIME OF THE STUDY, THE AIR FORCE WAS WORKING ON TWO RPV PROGRAMS, WHICH WERE SUBSEQUENTLY TERMINATED.

IN 1978 THE HOUSE ARMED SERVICES COMMITTEE COMMENTING ON THE INABILITY TO GET RPVS FIELDED, REPORTED THAT:

> "THE COMMITTEE HAS STRONGLY SUPPORTED THE DEVELOPMENT OF REMOTELY PILOTED VEHICLES. HOWEVER, THE SIGNIFICANT INVESTMENT IN DEVELOPMENT AND THE LACK OF SUCCESS IN DEPLOYING NEW VEHICLES HAVE HIGHLIGHTED THE DEPARTMENT OF DEFENSE'S INEFFICIENT MANAGEMENT IN THIS AREA.

THE COMMITTEE FINDS LITTLE RATIONALE TO SUPPORT BASE TECHNOLOGY PROGRAMS FOR THE REMOTELY PILOTED VEHICLES DUE TO THE DEPARTMENT OF DEFENSE'S INABILITY TO FIELD NEW VEHICLES. THE COMMITTEE CAN CONTINUE TO SUPPORT FULL SCALE DEVELOPMENT PROGRAMS ONLY IF THE DEPARTMENT CAN DEMONSTRATE ITS ABILITY TO TRANSITION THESE PROGRAMS INTO FIELDED HARDWARE. THE COMMITTEE WOULD ALSO LIKE TO CONVEY SUPPORT FOR THE REQUIREMENT TO HAVE RPVS IN OUR MILITARY INVENTORY IN VIEW OF THEIR DEMONSTRATED PERFORMANCE IN ACTUAL COMBAT. THE COMMITTEE HAS BEEN CONCERNED OVER THE DECLINE OF SERVICE SUPPORT FOR THESE NECESSARY SYSTEMS THAT NOT ONLY SERVE AS FORCE MULTIPLIERS, BUT COULD IN MANY INSTANCES PERFORM THOSE MISSIONS THAT GREATLY ENDANGER OUR PILOTS."

IN PURSUING THE ISSUE OF WHY RPV TECHNOLOGY WAS NOT WIDELY USED BY DOD, WE ASKED THE EXPERTS SUCH QUESTIONS AS: WHAT EVENTS BROUGHT ABOUT THE DECLINE IN FAVOR OF RPVS WITH THE MILITARY AFTER VIETNAM? ARE THERE MILITARY MISSIONS FOR RPVS? DO THE ADVANTAGES OF RPVS OUTWEIGH THE DISAVANTAGES? WHAT ARE THE CAUSES FOR LIMITED USE OF RPV TECHNOLOGY?

WE FOUND THAT THERE WAS A MARKED DEGREE OF CONSENSUS THAT MILITARY MISSIONS EXIST FOR RPVS (FIG. 3, P. 13.) BUT THAT RELUCTANCE OF POTENTIAL USERS TO CONSIDER SOMETHING OTHER THAN MANNED AIRCRAFT LED TO STAGNATION OF RPV DEVELOPMENT

EFFORTS, A RESULTING LACK OF FUNDING SUPPORT, AND IN SOME CASES TO EVENTUAL CANCELLATION. IN DISCUSSING THIS MATTER OF USER RELUCTANCE WITH DOD AND IN ANALYZING COMMENTS BY THE RPV EXPERTS, WE FOUND THAT THE FALTERING ENTHUSIASM FOR RPVS WITHIN THE AIR FORCE SEEMED TO OCCUR ABOUT THE TIME THE STRATEGIC AIR COMMAND (SAC) TRANSFERRED CONTROL OF RPV OPERATIONS TO THE TACTICAL AIR COMMAND (TAC) IN 1976. IT WAS FELT THAT A SUPPORTABLE PACKAGE WAS NOT TRANSFERRED. AT THAT TIME FUNDING AND MANPOWER ALLOCATED FOR RPV OPERATIONS HAD DECREASED, INTELLIGENCE COMMUNITY SUPPORT FOR RPVS HAD WANED AND TAC WAS LEFT WITH AN OPERATIONALLY CUMBERSOME PROGRAM WHICH REQUIRED CONSIDERABLE SUPPORT PERSONNEL. TIGHT BUDGETS COMPOUNDED THE PROBLEM AND RPVS FOR ELECTRONIC AND RECONNAISSANCE MISSIONS BECAME EXPENDABLE.

ON A MORE GENERAL LEVEL, THE EXPERTS OFTEN MENTIONED THE "PRO-PILOT" BIAS. THIS REFERS TO A GENERAL RELUCTANCE TO REPLACE A KNOWN QUANTITY WITH AN UNKNOWN. THE RISK OF THE UNKNOWN IS CONSIDERED GREATER, THEREFORE ANY COST BENEFIT/EFFECTIVENESS MUST BE SKEWED HEAVILY IN FAVOR OF THE UNKNOWN QUANTITY BEFORE IT IS CONSIDERED COMPETITIVE. SOME RESPONDENTS BELIEVED THAT RPVS WERE PERCEIVED AS DRAB OR UNEXCITING COMPARED TO MANNED AIRCRAFT. (FIG. 5, P. 15.)

WE ALSO ASKED THE RPV EXPERTS TO COMPARE RPV ADVANTAGES AND DISADVANTAGES IN MILITARY MISSIONS IN 21 PERFORMANCE AREAS WITH PILOTED SYSTEMS. THEY WERE TO RECORD WHETHER RPVS OFFERED A MAJOR ADVANTAGE, NO ADVANTAGE, OR A MAJOR DISADVANTAGE. RPVS WERE SEEN BY NEARLY ALL RESPONDENTS AS HAVING THE GREATEST

ADVANTAGE OVER MANNED SYSTEMS WHERE THE MISSION ENTAILS GREAT RISK TO THE PILOT. THE NEXT MOST IMPORTANT REASON WAS THAT THE SMALLER SIZE AND LESS VISIBLE SILHOUETTE OF AN RPV ALLOWED IT TO HAVE A GREATER SURVIVABILITY THAN A LARGER AIRCRAFT. BETTER PERFORMANCE UNDER BORING, FATIGUING, AND HAZARDOUS CONDITIONS WERE ALSO VIEWED AS A MAJOR ADVANTAGE.

COST SAVINGS WERE ALSO SCORED AS A MAJOR ADVANTAGE, INCLUDING LOWER INITIAL SYSTEMS ACQUISITION COST, OPERATING COSTS, AND FUEL SAVINGS. CONSIDERING THE COSTS OF ACQUIRING A MANNED AIRCRAFT SYSTEM AND TRAINING A PILOT, RPVS OFFER AN ATTRACTIVE OPPORTUNITY TO REDUCE THE GROWING WEAPONS PROCUREMENT AND OPERATIONS COSTS.

ON THE NEGATIVE SIDE, THE MOST WIDELY PERCEIVED DISADVANTAGES TO MILITARY RPV SYSTEMS WERE THEIR PERFORMANCE UNDER EMERGENCY OR UNFORESEEN CONDITIONS, AND DIFFICULTIES IN RECOVERING THE RPV. IT IS CLEAR THAT UNMANNED VEHICLES CANNOT, AND PROBABLY NEVER WILL, BE ABLE TO DUPLICATE ENTIRELY THE ABILITIES A PILOT BRINGS TO HIS AIRCRAFT. FURTHER IMPROVEMENTS AND REFINEMENTS IN RPV TECHNOLOGY MAY, HOWEVER, LESSEN SOME CONCERNS IN THIS AREA. (FIG. 4, P. 14.)

CIVIL USE OF RPVS WILL DEPEND ON MILITARY DEVELOPMENT EFFORTS

OUR THIRD OBJECTIVE IN UNDERTAKING THIS STUDY WAS TO DETERMINE THE POTENTIAL FOR APPLYING RPV TECHNOLOGY TO NONMILITARY USES. A NUMBER OF PROMISING CIVIL APPLICATIONS FOR RPVS EXISTS AND THERE IS A CONTINUING NEED AND INTEREST IN THE USER COMMUNITY FOR

INEXPENSIVE AIRBORNE PLATFORMS. IN AREAS SUCH AS ATMOSPHERIC SAMPLING OR GROUND OR SEA SURVEILLANCE, THEY SHOW POTENTIAL FOR PROVIDING THE ALTITUDE ADVANTAGE AND FLEXIBILITY OF A HELICOPTER AT A FRACTION OF THE COST. FOR ANY MISSION WHERE PILOT RISK IS A FACTOR, RPVS OFFER A SAFE ALTERNATIVE. THEY ARE ALSO A PROMISING ALTERNATIVE WHERE BORING OR FATIGUING MISSIONS INCREASE THE LIKELIHOOD OF AN ACCIDENT.

AS MILITARY INTEREST IN RPVS HAS WANED, THE POSSIBILITY OF THEIR BEING USED IN THE CIVIL SECTOR HAS BECOME MORE REMOTE. PERHAPS BECAUSE OF THIS FACTOR, DEVELOPERS HAVE MADE LITTLE ATTEMPT TO MARKET RPVS IN THE CIVIL SECTOR. THEY ESTIMATE A LOW USE FOR MOST CIVIL MISSIONS, NOT ENOUGH TO PROFITABLY UNDERTAKE A DEVELOPMENT PROGRAM. WIDESPREAD USE OF RPVS IN CIVIL AVIATION IS, THEREFORE, NOT LIKELY. RPVS COULD BE USEFUL IN CIVIL AVIATION, BUT UNLESS MILITARY DEVELOPMENT BRINGS THEIR COST DOWN, THEY WILL NOT BE AFFORDABLE FOR MOST CIVIL APPLICATIONS.

IN SUMMATION...

THE MAJORITY OF INDIVIDUALS WHO HAVE BEEN INVOLVED WITH MILITARY RPV SYSTEMS FOR A NUMBER OF YEARS DO NOT ATTRIBUTE THE LOW LEVEL OF RPV USE TO PROBLEMS WITH THE TECHNOLOGY OR THE LACK OF PERCIEVED USERS' NEED. RATHER, THEY TRACE THE CAUSE TO THE INTERRELATED FACTORS OF RELUCTANCE ON THE PART OF USERS AND THE ENSUING LACK OF FUNDS FOR DEVELOPMENT.

ELIMINATING DANGER TO THE PILOT IS A MAJOR ADVANTAGE FOR RPVS. ITS LESS VISIBLE SILHOUETTE AND LOWER COSTS ARE ALSO VERY

IMPORTANT PLUSES. THE MAIN DISADVANTAGES ARE THE PROBLEMS WITH THE RECOVERY OF THE VEHICLES AND THEIR PERFORMANCE UNDER EMERGENCY OR UNFORESEEN CONDITIONS.

ACCORDING TO THE EXPERTS, RPVS CAN PERFORM SOME MISSIONS, PARTICULARLY HARASSMENT AND DECOY, MUCH BETTER THAN MANNED AIRCRAFT. TO A LESSER EXTENT, THEY WERE CONSIDERED BETTER FOR SURVEILLANCE/ RECONNAISSANCE AND ELECTRONIC WARFARE. RPVS ARE CONSIDERED LESS SUITABLE FOR ATTACK MISSIONS. (FIG. 3, P. 13.)

DOD AGREES THAT TECHNOLOGIES ARE NOW SUFFICIENTLY MATURE TO SUPPORT A VARIETY OF RPV APPLICATIONS AND POINTED OUT THAT THERE HAD BEEN SOME TECHNICAL PROBLEMS IN USING THIS TECHNOLOGY RESULTING IN COSTS THAT ARE HIGHER THAN INITIALLY PROJECTED, A FACTOR RELEVANT TO COMPARING COST EFFECTIVENESS OF RPVS AND ALTERNATIVE SYSTEMS. WE HAVE NOTED THAT TECHNICAL PROBLEMS AND COST INCREASES OCCUR IN BOTH UNMANNED AND MANNED AIRCRAFT PROGRAMS AND THESE FACTORS PER SE SHOULD NOT BE REASONS FOR NOT CONSIDERING RPVS AS VIABLE ALTERNATIVES WHEN MISSION REQUIREMENTS PERMIT THEIR USE.

DOD DOES NOT AGREE THAT CAREER ADVANCEMENT LIMITATIONS AND OCCUPATIONAL DRABNESS WERE HINDERING MILITARY ACCEPTANCE OF RPV SYSTEMS AND NOTED THAT THIS FINDING CAME PRINCIPALLY FROM A SURVEY OF EXPERTS, A SOURCE WHICH DOES NOT CONSTITUTE AN UNBIASED FORUM OF VIEWS. WHILE NOT NECESSARILY UNBIASED, THEIR GENERAL VIEWS ABOUT USER RELUCTANCE WE BELIEVE ARE COMPATIBLE WITH OTHER EVIDENCE WE DEVELOPED WHICH ALSO SUGGESTS THAT RPV TECHNOLOGY HAS NOT BEEN VIGOROUSLY PURSUED BY THE MILITARY.

DOD BELIEVES THAT MILITARY USERS HAVE BEEN WILLING TO OBJECTIVELY ASSESS THE MERITS OF RPVS IN COMPARISON WITH OTHER WAYS OF PROVIDING REQUIRED OPERATIONAL CAPABILITIES NOTING THAT RPV TECHNOLOGIES ARE CURRENTLY BEING APPLIED TO SEVERAL SYSTEMS NOW IN DEVELOPMENT (LOCUST, THE ARMY'S RPV, AND THE FAMILY OF CRUISE MISSILES). DOD HAS INDICATED A WILLINGNESS TO CONTINUE TO CONSIDER APPLICATION OF RPV TECHNOLOGY AND SUPPORT RPV ACQUISITION PROGRAMS WHEN APPROPRITATE.

IN VIEW OF THE INFORMATION WE DEVELOPED AND DOD'S POSITION, WE FEEL STRONGLY THAT THERE SHOULD BE A CLOSE SCRUTINY OF PROPOSED MANNED AIRCRAFT DEVELOPMENTS BY CONGRESS AS WELL AS DOD TOP MANAGEMENT TO ASSURE THAT ADEQUATE CONSIDERATION IS GIVEN TO THE USE OF THE RPV TECHNOLOGY FOR SOME OF THE MISSIONS TO BE PERFORMED. IT DOES NOT NECESSARILY MEAN AN EXCLUSIVE CHOICE BETWEEN UNMANNED VEHICLES OR MANNED VEHICLES, BUT SEEKING THE RIGHT WEAPONS MIX FOR PARTICULAR MISSIONS. WHILE DOD IS MAKING SOME USE OF RPV TECHNOLOGY, THERE IS A NEED TO ASSURE THAT ITS USE IS MAXIMIZED WHERE SUITED TO SAVE LIVES AND MONEY.

FIGURES 1 THRU 6

Figure 1

BARRIERS TO THE USE OF RPVS

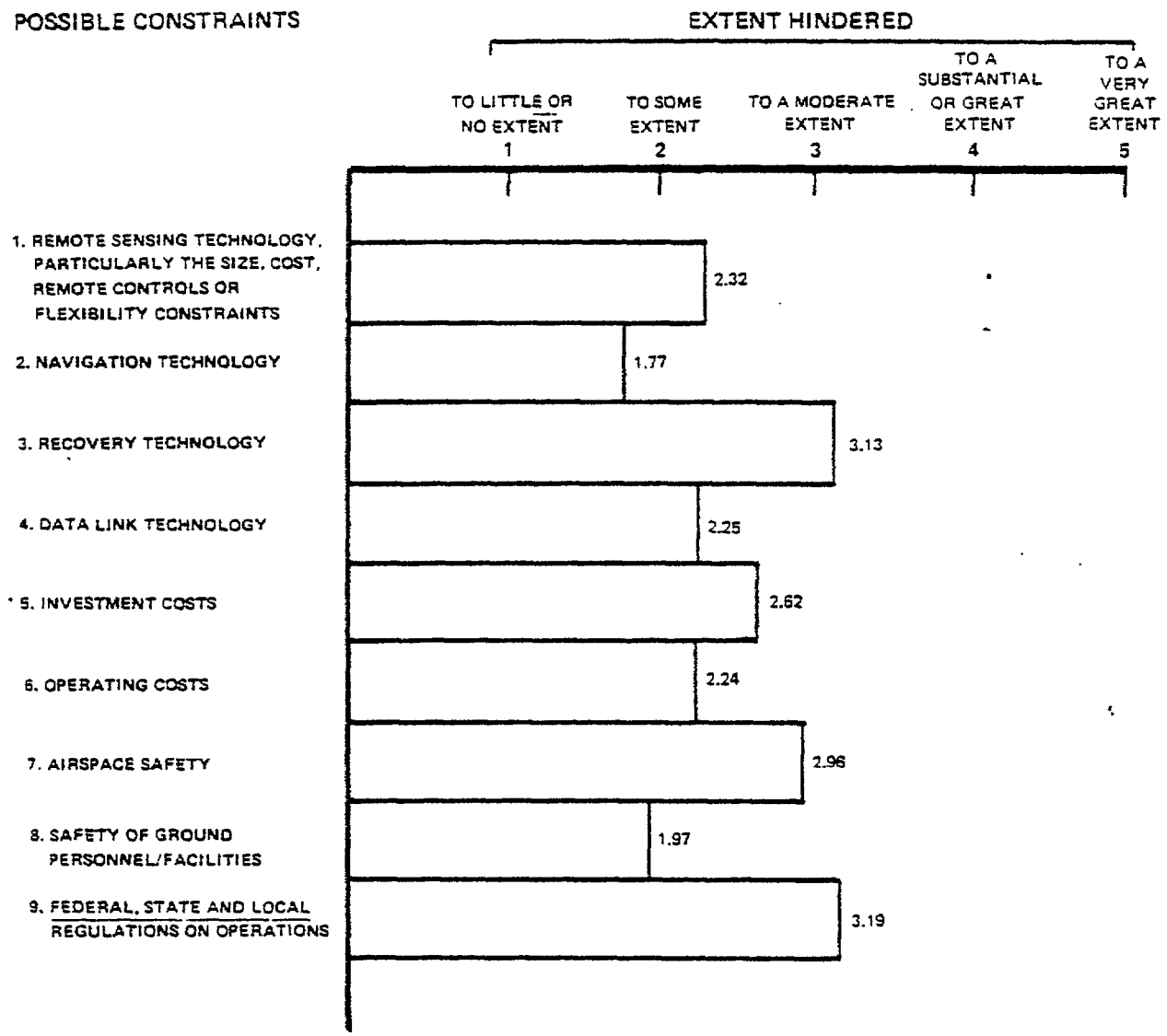

Figure 2

REASONS FOR LACK OF RPV UTILIZATION

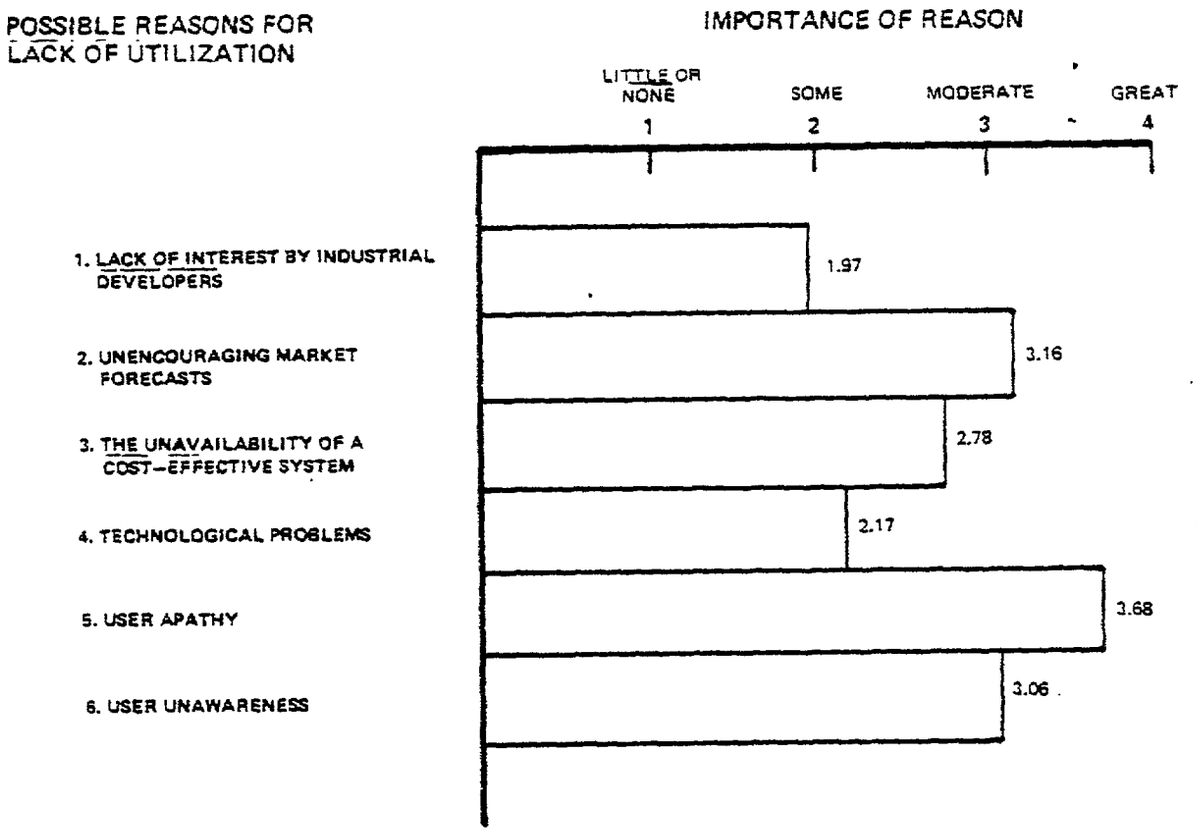

Figure 3

RPV PERFORMANCE ON SELECTED MILITARY MISSIONS

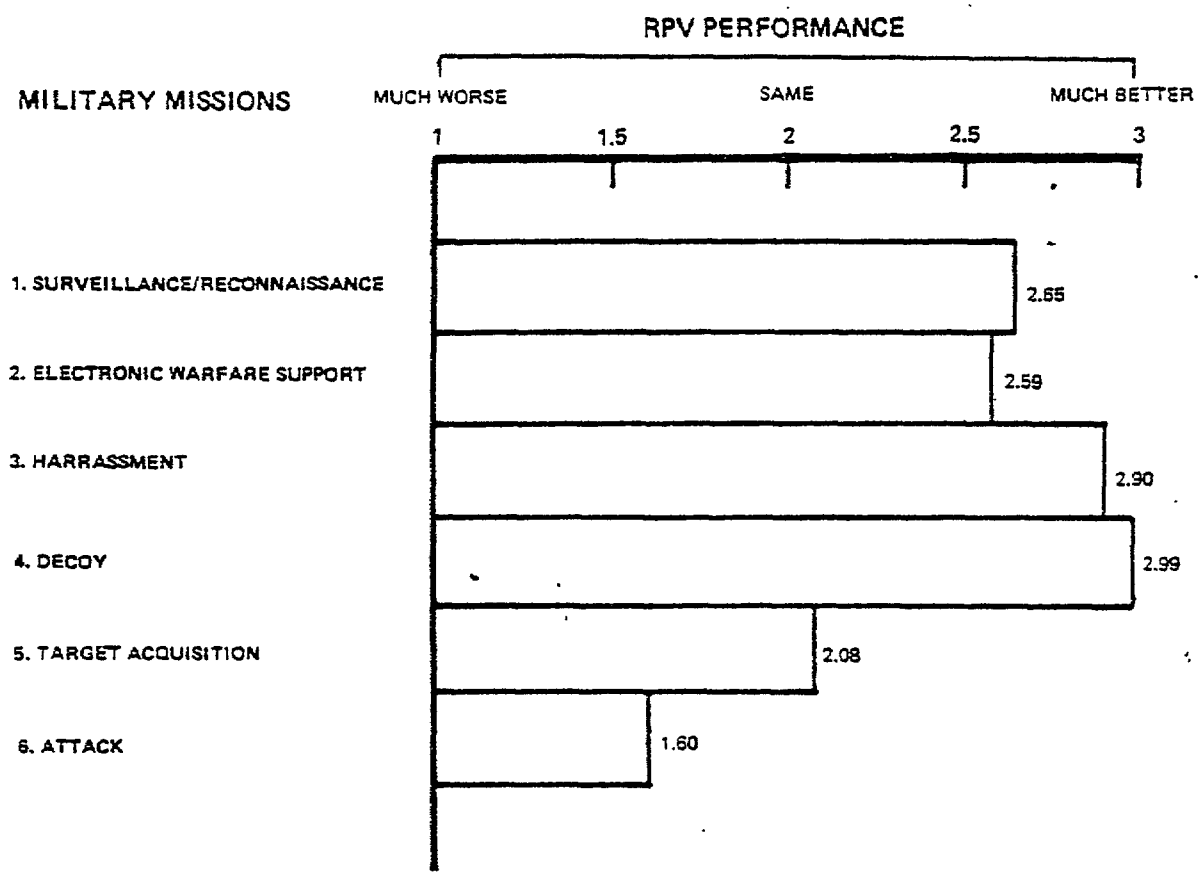

Figure 4

RPV ADVANTAGES AND DISADVANTAGES IN MILITARY MISSIONS

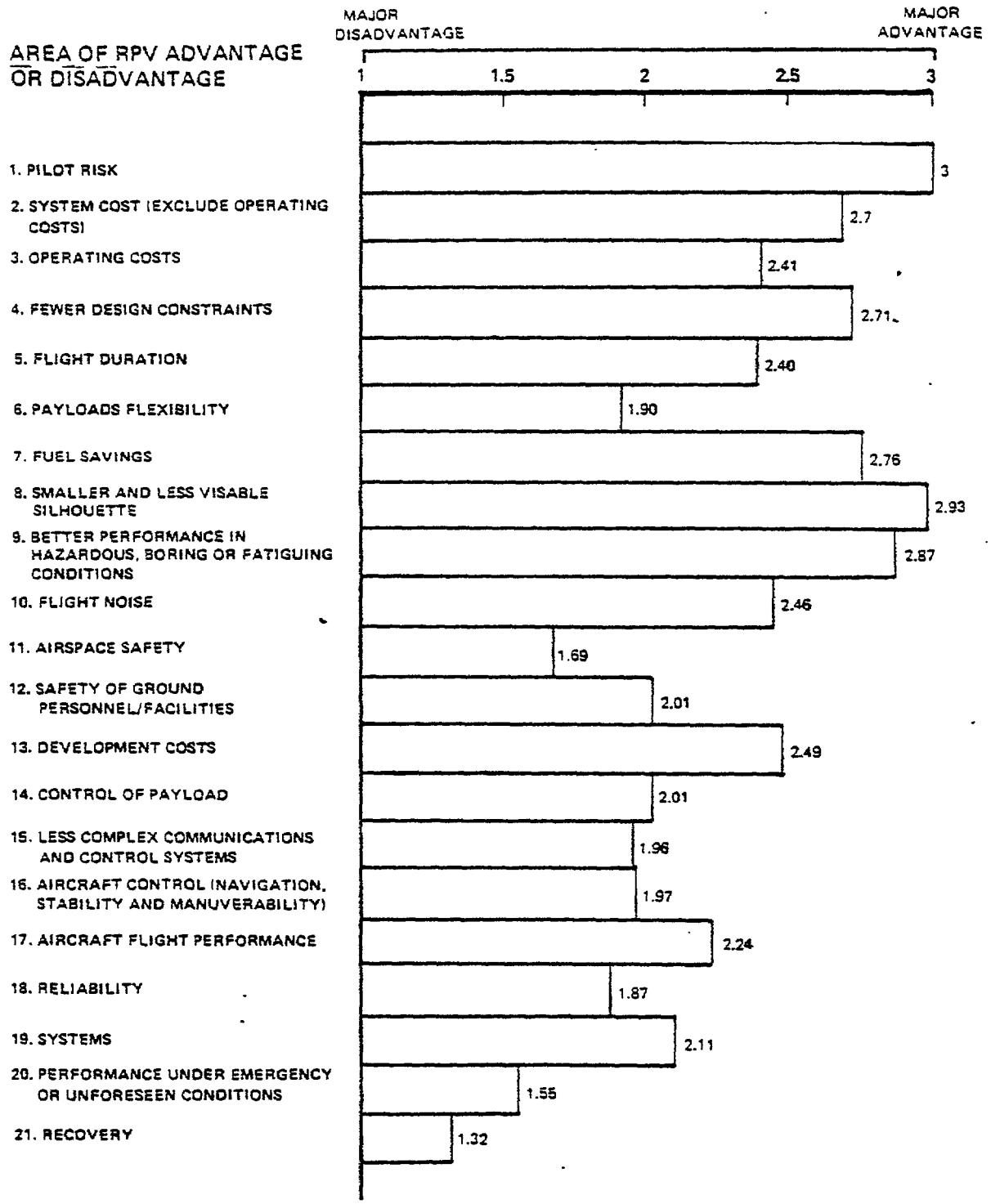

Figure 5

REASONS FOR LACK OF DIFFUSION AND UTILIZATION OF RPV TECHNOLOGY

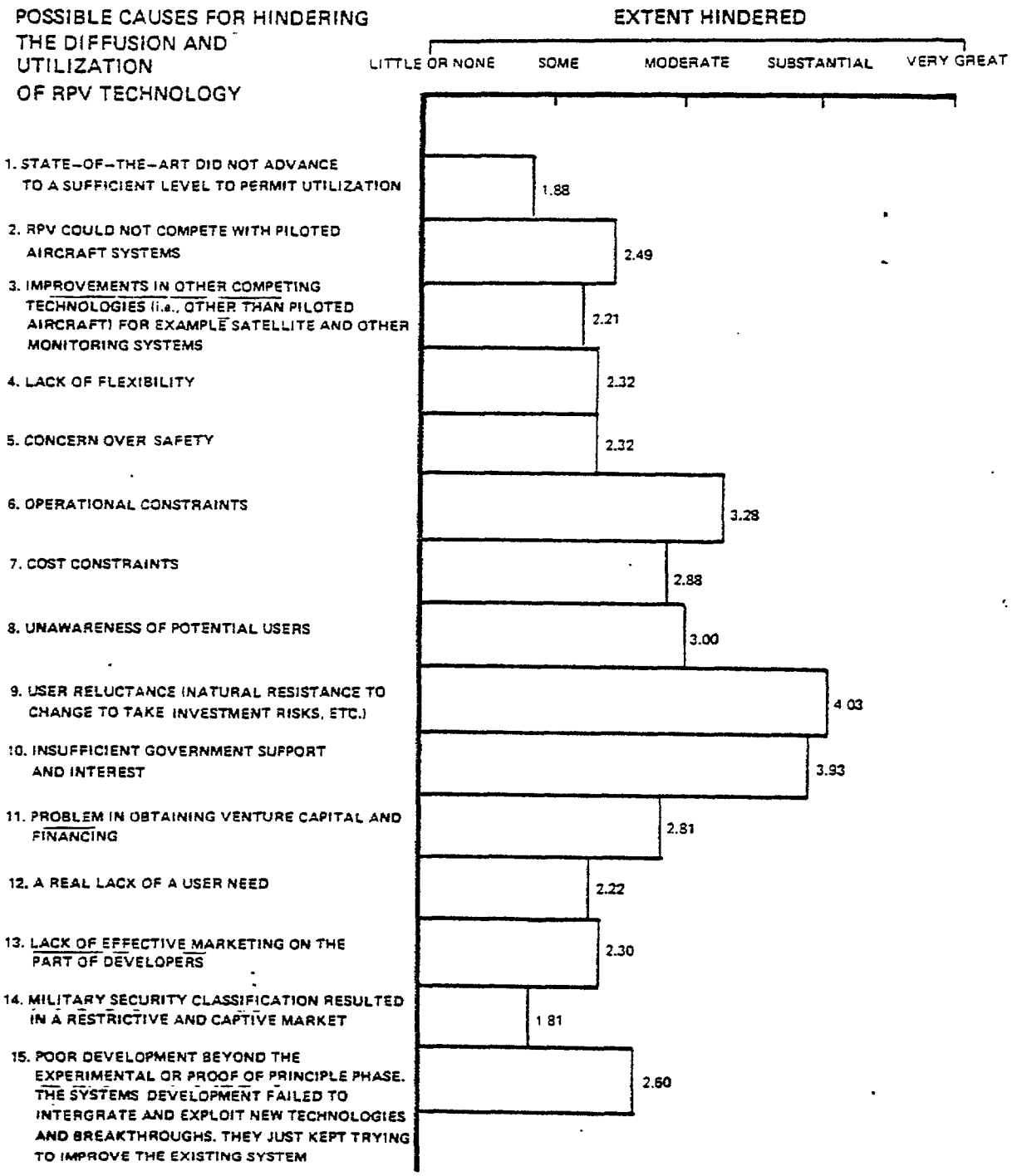

Figure 6

RPV ADVANTAGES AND DISADVANTAGES IN NON–MILITARY MISSIONS