APPENDIX A
PROJECT PLANNING GUIDE

1.0 MILITARY SUPPORT DIVISION (MSD - Administrative Assistance) - This section is to provide an administrative guide for the use of NRL airborne research aircraft. It will introduce the Project Team to the NRL MSD and what is required to schedule an aircraft and certify scientists to fly in support of the project. It will also explain the responsibilities of the MSD and the project personnel and provide basic information and guidance in other areas.

1.1 User Responsibilities - In preparing for a mission on VXS-1 aircraft, the Project Team will be responsible for:

- Contacting the NRL MSD as defined in section 2.4 of the basic manual
- Define mission goals
- Provide flight profiles and limitations
- Present proposed schedule including “Fly Dates”, dates of install/de-install, and any associated ground testing requirements
- Present flight durations and frequency of flights
- Provide recommended flight/project location
- Present flight crew requirements
- Request payload size, weight, and requirements

Provide the MSD with an FSR (provided in appendix A section 2.0)

Provide MSD with an “Authorization to Charge” form (provided in appendix A section 2.0)

* This information is included on the FSR form available in Section 2.0 of this appendix.

1.2 Military Support Division Responsibilities - Once the MSD has been contacted by the project team and has received the project FSR, a Naval Pilot or Naval Flight Officer will be assigned as the PO. He/she will describe the flight hour costs, including the following aspects:

- “Wheels Up to Touch Down” method of computing flight hrs, (as applicable)
• Flight hour charges, for install/de-install/ground testing and under-utilization charges, and how they apply

• Determine specific aircraft to support project and provide aircraft side number

• Assist in obtaining Project Specialist Qualifications

• Provide a NRL FSD Project Support Manual

• Obtain air space reservations

• Obtain country clearances (if required)

• Provide flight planning

• Set up for airfield logistical support

• Arrange lodging and transportation

2.0 FLIGHT SERVICE REQUESTS (FSR, HQ-NRL 13000/1) AND AUTHORIZATIONS TO CHARGE, RESEARCH DIVISION JOB ORDER (Auth-to-Chg, HQ-NRL 7300/1) - These forms are the official requests from users to utilize VXS-1 aircraft. The project will be “penciled in” on the long-range schedule upon receipt of the FSR but only “hard” scheduled upon receipt of the Authorization To Charge document. VXS-1 operates as a Service Cost Center within the framework of the Navy Working Capital Fund. Accordingly, all costs must be recovered via user fees and stabilized billing rate charges to its customers. The FSR form will be the scheduling document utilized by the NRL MSD in assigning an aircraft and should be closely followed by the Authorization-to-Charge document with funding in order to pay for the requested flight hours. Additional funding required for travel costs and personnel per diem and incidental expenses can be submitted at a later date, but must be received within 30 days of completion of the project. The Project Lead will submit an FSR to include: Project name, purpose, sponsor, location of the project, and if special operating areas will be required. Other information to include on the FSR are date of project, install date, de-install date, number, length, and frequency of requested flights, main and alternate POC information, information on project equipment, flight profiles, and if other platforms will be involved. When the NRL MSD receives the FSR, a PO will be assigned and the Project Lead will be contacted. The Authorization-to-Charge is the form authorizing NRL to bill the project for expenses. This form includes the project name, dates, Job Order Number that MSD can charge to, and a section for the MSD to fill in upon completion of the project with explanation of charges.
## FLIGHT SERVICE REQUEST

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<td>3. TO:</td>
<td>CODE 1410</td>
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<td>4. SUBJ:</td>
<td>FLIGHT SERVICE REQUEST FOR (Project Name)</td>
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<td>5. SHORT TITLE</td>
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<tr>
<td>6. PROJECT COORDINATOR (Please Print)</td>
<td>7. BRANCH HEAD (Please Print)</td>
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<td>8. PHONE NUMBER</td>
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### INSTALL/DEINSTALL INFORMATION

| 10. DATE/PLACE INSTALL WILL COMMENCE | 11. DATE/PLACE DEINSTALL WILL COMPLETE |

### DESCRIPTION OF FLIGHT SERVICE

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<tr>
<th>12. AIRCRAFT BUNO</th>
<th>13. NO. OF FLIGHTS</th>
<th>14. DURATION OF FLIGHTS (Hrs)</th>
<th>15. FREQUENCY OF FLIGHTS</th>
<th>16. NO. OF PROJECT PERSONNEL</th>
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<td>17. OTHER TEST PLATFORMS</td>
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### AUXILIARY POWER

19. WILL AUXILIARY POWER BE NEEDED?
   - Yes, go to No. 20.
   - No, go to No. 21.

20. WHAT TYPE OF AUXILIARY POWER?

21. DESCRIPTION OF FLIGHT (Include Project Limitations, Flight Profile, Detachment Site Info and Support/Coordination Requirements)

22. OPERATIONS Desired/Who will schedule it?
# Authorization to Charge Research Division Job Order Number

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<td>TO:</td>
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<td>VIA:</td>
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<td>PROJECT NAME</td>
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**DATES** (including installation and disinstallation time)

**FROM:**      **TO:**

**FLIGHT HOUR JOB ORDER NUMBER (J.O.N.):**

**HOURS AUTHORIZED (Per current NRL instruction):**

**TRAVEL/PER DIEM J.O.N. (Charged to Flight Hour J.O.N. if left blank):**

**OTHER REIMBURSABLE COSTS J.O.N. (Per current NRL instruction):**

**NAME (Project Point of Contact):**

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**SIGNATURE (Branch Head/Project Manager):**

**DATE:**

**SIGNATURE (Division Superintendent):**

**DATE:**

**FROM:** CODE 1400

**TO:** CODE 1202

**NUMBER OF HOURS FLOWN:**

**PERIOD OF DAYS:**

**UNDERUTILIZATION CHARGE:**

**REIMBURSABLE COSTS (Except travel/per diem):**

**SIGNATURE (Military Operations Representative):**

**COPY TO:**

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*Image Reference:* [36x39] 4
3.0 **PROJECT SPECIALIST FLIGHT QUALIFICATION** - As soon as a Project Lead determines that a project will require a VXS-1 Aircraft, he/she will need to get the appropriate personnel flight-qualified as soon as possible. The following list are actions items required for prospective Project Specialists:

- A written memo from the Project Lead to the NRL MSD PO providing the project to be supported and personnel needing qualification.

- Individuals requesting flight certification will have to obtain a medical physical which will include a general physical check-up and Lab Tests - Blood, Lab, BP, Weight, EKG, etc. This can be performed by a military flight surgeon for U.S. Govt. personnel, but civilian contracting personnel must get theirs done by a private physician. This medical clearance will be valid for 1 year, birthday month to birthday month.

- Once the medical physical is complete, all pertinent forms should be submitted to the NRL MSD PO who will submit them all to VXS-1’s Flight Surgeon. The flight surgeon will then issue what’s called an “UP CHIT” for that individual and it will be good for the same one-year period described above.

- The NRL MSD PO, upon receipt of the “UP CHIT”, will schedule the prospective Project Specialist into a Navy approved Flight Physiology Training Course. This is where the scientist will get aircraft safety and survival swim training. This training is good for a 3-year period.

- Flight and medical waivers for a “ONE FLIGHT ONLY” can be requested through the NRL MSD PO. This is usually reserved for VIPs/DVs or high-level sponsors, and is Not Renewable.

4.0 **VXS-1 SPECIAL PROJECTS DIVISION (Technical)** - VXS1’s Special Projects Division is the technical interface between the project personnel and the Navy. This office is responsible for all projects flown on VXS-1 aircraft and will help the project meet Navy Safety-of-Flight requirements as well as flight clearances for installed equipment. As stated previously, “the key to a successful project is early and continued interface between the project scientists and VXS-1’s Special Projects Teams.” This early contact will help to ensure a smooth installation and that all Navy Certification Requirements have been identified. It will also make certain that all flight clearance documentation and signatures are in place prior to installation. This section of appendix A will explain the installation and de-installation processes and responsibilities, and should assist the Project Lead in his/her planning and execution.
4.1 User Responsibilities - In preparing for a mission on VXS-1 aircraft, the Project Lead will be responsible for:

- Once a project has been designated by the MSD, the Project Lead will contact the VXS-1 Special Project Liaison Officer (PLO) (as per section 2.4.2 in the main manual) to discuss the technical aspects of the proposed project and to initiate early interaction between the Navy and the project personnel with their equipment.

- Provide a “Project Load Out Sheet” (provided on page 8 of this Appendix) to the Special PLO detailing equipment, required power, cabling, and any other project requirements needed for installation on the aircraft.

- Provide a rough sketch of proposed equipment locations utilizing the floor plans provided in Appendix B.

- Adhere to the standards for installations presented in section 5.0 of this appendix.

- Responsible for providing power drawings in block diagram form with wire sizes, required circuit breaker protection, and power usage requirements.

  ![Example of Power Requirements Block diagram](image)

- Provide E³ data, including system description schematics and block diagrams, required for NAVAIR flight clearances.

- Responsible for providing necessary funding to cover all technical aspects. These include certification testing, installation/materials, and work to be performed at the NAWC/AD facility at NAS.
4.2 Special Projects Responsibilities - The VXS-1 Special Projects Office is the central point of contact between the project technical specialists and the Navy, and they will also provide liaison and coordination between the project team, the NRL MSD, Maintenance Officer, and NAVAIR Certification Offices. Some other responsibilities of the Special Projects Office are:

- Providing guidance to project personnel on equipment airworthiness.

- Assist in the development of a usable floor plan to ensure center-of-gravity and floor-loading requirements onboard the aircraft are met.

- Provide necessary information to ensure power and other project interfaces with the aircraft are available and clearly defined.

- Provide access to Navy Standards Documentation that affords the project personnel the necessary information during the development, installation, de-installation, and certification of a project.

- Develop the “RED SHEET” based on the project load out sheet.

- Interface with NAVAIR and NAWC/AD in obtaining Safety-of-Flight Certifications.

- Obtain flight clearances for the installed project equipment.

- Assist the project during the installation and de-installation including:
  - Providing a safety and project requirements brief to the Project Team prior to working on or around the aircraft.
  - Inform project personnel on the operation of all Ground Support Equipment.
  - Certain inspections upon completion of installation and de-installation.

- VXS-1 recommended Load-Out Sheet specifically handles each piece of equipment. The project personnel will submit the Load-Out Sheet with the items, weights, and if the items are going on or coming off the aircraft. The Special Projects Office will be responsible for the station and moment blocks. An example is provided on the following page.
## PROJECT LOAD-OUT SHEET

<table>
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<th>IN</th>
<th>OUT</th>
<th>ITEM/NOMENCLATURE</th>
<th>WEIGHT/LBS</th>
<th>STATION *</th>
<th>MOMENT *</th>
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* TO BE FILLED IN BY VXS-1 SPECIAL PROJECTS OFFICE
5.0 **PROJECT EQUIPMENT/MATERIAL REQUIREMENTS** - All projects installed on VXS-1 aircraft are subject to standards and certification requirements set forth by NAVAIR and promulgated in the VXS-1 INST 13100.1. The VXS-1 Special PLO will be responsible for overseeing that flight clearances and NAVAIR certification requirements are met. The Special PLO is also responsible for ensuring all installed equipment and hardware meet NAVAIR specifications. The project personnel are responsible for providing required documentation which can include drawings, wiring diagrams, and stress analysis, etc. to the VXS-1 Special Projects Office in order to obtain flight certification/safety clearances. The project shall also adhere to the installation and removal standards set forth by NAVAIR.

5.1 **Materials** - Materials and equipment used in project installations shall meet Military Specifications (MS), Air Force/Navy Aeronautical (AN), Joint Army/Navy Specification (JAN), or National Aeronautical Standard (NAS) parts. When commercial hardware, such as screws, bolts, nuts, cotter pins, etc. are substituted they must possess suitable properties to the military counterparts listed above.

5.2 **Operator/Equipment Racks** - All operator/equipment racks utilized on board VXS-1 aircraft will confirm to the 20G “Crash Load” criteria set forth in MIL-A-8865 or as set forth by AIR 4.3.3 (Air Vehicles Structures). The VXS-1 Special Projects Office will assist each project in obtaining racks that meet this NAVAIR requirement.

- All installed electronics must meet the standards referenced in section 5.0 of the Project Support Manual.
  - Electronic equipment will be bolted and/or strapped to mounting plates, which will then be secured to the rack where it is to be housed.
  - All equipment mounted in equipment racks will utilize power strips that are circuit breakered, in order to provide equipment isolation from the aircraft circuit breakers that are utilized to power the project positions.
5.3 **External Stores** - All suspended equipment, such as instrumentation or electronics pods and/or cameras mounted to the exterior of the airframe, must have a local flight clearance authorized from the Air Vehicles Stores Compatibility Department (AIR 4.11.2) in accordance with NAWCADINST 13034.1. In developing electronic and/or instrument pods, only NAVAIR approved shapes may be utilized. Once the pod is assembled, it must meet NAVAIR Center-of-Gravity requirements associated with the attachment points.

5.4 **Wires and Cabling** - Wires and cables utilized by the project, and installed on VXS-1 aircraft shall conform to standards defined in NA-01-1A-505 and SAE-AS-50881. Existing cable troughs will be utilized as much as possible to route cables throughout the aircraft.

- Wires and cables installations - Will be installed accordingly, to protect against hazards such as:
  - Chafing of wires
  - Damage by personnel moving in aircraft
  - High temperature areas
  - Flammable materials
  - Combustible materials

- Wiring Insulation Material - With the exception of Poly Vinyl, Chloride, and Kapton, any insulation material that meets military specifications as defined in 5.1 above may be used.

- Electronic Bonding and Grounding to Aircraft - Bonding and grounding of project equipment connections made in the aircraft shall be in accordance with the NAVAIR reference in 5.4. The number of wires connected to any one-ground terminal shall be limited to four.

- Slack in Wires and Cables - Excess slack shall not be permitted in wires and cables. However, enough slack will be permitted to:
  - Permit ease of maintenance
  - Allow replacement of terminals and junctions
  - Prevent mechanical strain on cables, cable junctions and cable supports
- Permit free movement of shock and vibration mounted equipment
- Permit shifting of equipment to allow servicing, alignment, tuning, and removal of dust covers for performance of on-board maintenance and changing of components
- Allow for drip loops

- Securing cables - Wire bundles shall be secured in place by clamps, spot ties, or plastic straps that meet MIL-S-23190. The following limitations apply:
  - Plastic cable straps shall not be used where the restrictions of SAE-AS-50881 paragraph 3.11.3.8.1 – 3.11.3.8.7 apply.
  - Continuous lacing shall not be used except in panels and junction boxes.

- Routing in Pressurized areas – VXS-1 aircraft are equipped with pressure bulkhead fittings located to the nose and bomb bay of the aircraft. If other fuselage penetration is required, the following procedures have to be met and the VXS-1 Special Project Office will provide any assistance the project team may need.

- Bulkhead fittings and/or connectors shall be utilized when it is necessary to penetrate pressurized areas from the cabin.
  - Bulkhead fittings and connectors shall be flanged on the pressure side and shall be sealed by gaskets or approved non-toxic sealant.
  - All repairs and reinforcements to pressurized bulkheads shall be installed using a sealant between the repair and the bulkhead.
5.5 **Electromagnetic Environmental Effects (E³)** - It is required that all projects installed have suitable isolation to prevent aircraft system degradation. This requirement ensures that there is no interference between the project systems and the aircraft systems. The project personnel are responsible for the E³ analysis and testing and must provide prompt documentation to the Special Projects Office. Once the documentation is presented, the Special Projects office will submit the data to NAVAIR 5.1 for analysis and determination as to the required testing. Electronic Isolation is addressed as EMC and EMV SOFT, TEMPEST, and HERO analysis/testing.

- **Electromagnetic Compatibility Safety-of-Flight (EMC SOFT)** - This test will make sure that there is no electrical system degradation and/or interference with the aircraft Safety-of-Flight systems.

- **Electromagnetic Vulnerability Safety-of-Flight (EMV SOFT)** - Is required when an aircraft has a flight critical system added or an installed project system will interface with an aircraft flight critical system. An EMV is also required if the project is required to conduct flight operations near high-power transmitters, including surface units, land based units, or other aircraft.

- **TEMPEST** - This testing is required if the installed project involves a system that processes, converts, reproduces, or otherwise manipulates any form of classified information.

- **Hazards of Electromagnetic Radiation to Ordnance (HERO)** - This test is required if the project has Electrically Initiated Devices (EID), including ordnance, pylons, cable cutters, and countermeasures.

5.6 **Project Installation** - The VXS-1 Special Projects Office will oversee all installations on VXS-1 aircraft. The Special Projects Office is also responsible to the Commanding Officer of VXS-1 and ensures all projects installed on VXS-1 aircraft meet NAVAIR standards. It cannot be stressed enough that the success of a project is promulgated on early contact between the VXS-1 Special Projects Office and the project team. To assist the project team in developing their project installation in accordance with Navy and VXS-1 specifications, the following list may help:

- Prior to installing a project on the aircraft, the project will stage their equipment to the Special Project Office work area where a PLO will be assigned.

- The PLO will perform an inspection of the equipment to be installed and then transport the project to the aircraft.
• The project team will assist in loading and is responsible for connecting equipment on the aircraft.

• When install is completed, the VXS-1 PLO will hold a final inspection to ensure the aircraft is in a SAFE-TO-FLY state and then release the aircraft to VXS-1 Maintenance Control.

5.7 Project Removal - Upon completion of the project missions, the project team will de-install the equipment and return the aircraft to its original configuration.

• The project team is responsible for removing all project-associated hardware and cabling.

• The VXS-1 PLO will be responsible for overseeing unloading and will transport the project back to the Special Projects Staging Area.

• Upon complete removal from the aircraft, the VXS-1 PLO will perform a final aircraft inspection ensuring the aircraft has been returned to its original configuration.

6.0 WORK REQUIREMENTS - To guarantee a safe project is installed, flown, and de-installed from a VXS-1 aircraft, the below guidelines are promulgated. These guidelines are in accordance with Navy Safety Regulations and are strictly adhered to and enforced when working in or around the aircraft.

6.1 Tools - At VXS-1, and throughout the Navy, a strict tool control program shall be adhered to.

• Tool Control Program - All tools must be inventoried prior to, and at the completion of all project work, by a VXS-1 Special Projects Coordinator and/or a VXS-1 tool room supervisor. All project toolboxes must have an inventory sheet that identifies all tools and consumables that will be taken onboard VXS-1 aircraft. If special tools are required for your project, contact the PLO to obtain the proper procedures for tool inventory and handling. No loose tools or tools concealed in pockets, brief cases, bags, etc. are allowed at any time. If a tool is lost, make a thorough search of the work area. If that tool is not found, contact the PLO immediately. The Tool Control Program at VXS-1 is strictly enforced and there will be no exceptions to this policy.
• Power Tools - While working with power tools, always observe the safety precautions associated with the equipment, (i.e. eye protection, hearing protection, shock hazards, etc.) Only non-sparking power tools are allowed on the aircraft. NO electric drills are authorized without prior approval from the PLO.

6.2 Ground/Flight Line Safety - Each person that works on and/or around the VXS-1 aircraft must receive a safety brief prior to gaining access to the flight line and to the aircraft. All personnel including military, project specialists, and contractors require this safety brief. This brief will be given by one of the VXS-1 PLO’s when the time comes. The goal at the VXS-1 Special Projects Office is to assist the project personnel in getting their projects on and off the aircraft in the SAFEST most expeditious manner. Strict compliance with all safety procedures, as defined in the Navy safety and the VXS-1 13100.1 instructions, is mandatory. The ground safety procedures observed by VXS-1 personnel are in accordance with the Standard Naval Aviation Ground Safety Procedures and deviation from these standards will not be tolerated. While working on the flight line, there are several dangers that project specialists need to be aware of. Be alert at all times to your surroundings while working on or around the flight line.

• FOD - Foreign Object Damage (FOD) is any item such as a tool, safety wire, loose screw, nut, washer, soda can, used tie wrap, or any number of other items that could be ingested into an aircraft engine or bind a flight control. Be diligent with your work; don’t leave anything behind after completing a job. FOD can and will cause loss of life and aircraft if not prevented.

• Hearing - Always use hearing protection, the APU and running engines are very loud and after prolonged exposure, hearing loss will occur.

• Radiation Hazard - If you see an aircraft with the taxi lights and strobe lights on while it is parked, this is an indication that the RADAR is operating on board that aircraft and you should remain well clear of the nose area of the aircraft.

• Aircraft Start-up - If an aircraft is getting ready to start engines, there will be a lineman in a yellow jacket in front of the aircraft. Stay away from the aircraft if you see this condition.

• Head covering - Never wear ball caps or hats on the flight line, these are possible FOD hazards and can cause serious damage to the aircraft and possible injury to personnel.
• Safety shoes – Steel-toed safety boots or ankle-high steel-toed shoes are mandatory while working on the flight line, in the hanger, or around the aircraft.

• Propeller Arc - While working around P-3 aircraft, be aware of the long diameter of the propeller (PROP ARC). NEVER CROSS THROUGH THE PROP ARCS. The areas between the fuselage of the aircraft and the outboard propeller are considered the PROP ARC areas. We do not want to get accustomed to crossing through these areas at any time.

• Diamond Area and Vehicles - The diamond area is defined as all points from the nose of the aircraft to either wing tip and from either wing tip to the aircraft tail. All vehicles penetrating these areas must have an outside safety observer present. This is to prevent inadvertent damage to the aircraft.

• Bomb-Bay Doors - The bomb-bay doors on a P-3 aircraft takes less than 4 seconds to open or close. This is extremely fast when you may be working in this area and not expecting the doors to operate. Whenever working in this area or working in the bomb bay, you must have a PLO or qualified VXS-1 lineman on hand to assist you. Never attempt to work on or around this area without notifying the PLO, who will then notify VXS-1 Maintenance Control.

6.3 Flight Safety - Since project personnel will be flying on VXS-1 aircraft, they will adhere to the Naval Aircrew Policies and Procedures as defined by the Navy. These policies were established to provide maximum safety to all personnel on the aircraft and to ensure a successful mission.

• Flight Qualifications - Project personnel who need to fly during the project mission must become designated as an NRL Project Specialist. Requirements for certification include passing a medical evaluation and the Naval Flight Physiology Water Survival Class. The Naval PO will assist all prospective Project Specialists in obtaining these certifications. Detailed procedures for obtaining Project Specialist Certification are presented in section 3.0 of this appendix.

• Clothing - The Navy requires all flight personnel to wear Navy approved flight clothing. This clothing consists of a flight suit, steel-toed flight boots, and flight gloves. Project Specialists are responsible for obtaining these items that can be ordered and purchased at the VXS-1 para-loft department. As a last resort,
these items can also be checked out on a loaner-type basis from the para-loft and must be returned when the project is completed.

- **Pre-Flight** - All flight crew personnel are required to arrive at the aircraft two hours prior to the take-off time. This pre-flight time is utilized for preparing for the mission, checking out project equipment, inspecting flight safety equipment, and briefing the pilots and/or navigator on mission requirements. If it is a Project Specialist’s first flight, a Navy Aircrewman will brief them on all flight safety issues and procedures.

- **Mission** - During the flight, all project members will adhere to the commands of the Pilot-In-Command (PIC). Each mission will also have a designated Project Lead whose responsibility is to coordinate with the Navy Flight Crew during the project. This Project Lead will be responsible for briefing the PIC on all mission goals and flight profiles during the pre-flight. During the mission, the Project Lead will interface with the PIC and make him/her aware of mission progress and any changes that may be required to accomplish the mission successfully. This interaction between the PIC and the Project Lead is paramount and will make certain that the scientific goals of each project will be obtained. Upon completion of a mission, the project personnel are responsible for cleaning up their work areas, securing their equipment, and notifying the Project Lead when they are ready for landing.

- **Post Flight** - Once the aircraft has returned from its mission and has shut down engines, the project personnel will remove all project mission material and advise the Project Lead of any problem areas that will have to be addressed during the down time and before the next flight. The Project Lead will interface with the appropriate VXS-1 personnel in order to fix any and all problems he/she deems necessary.