

RFI Category and Number: Women in Aviation, RFI #7

RFI Question:

In December 2022, via RFI 5, the Military Services briefed DACOWITS on the updates to properly fitting personal protective equipment (PPE) and combat equipment for women. As a follow-up, the Committee requests a written response from the Army, Navy, Marine Corps, Air Force, and Coast Guard to provide more information on female in-flight bladder relief systems (IBRS) and/or female urinary devices, to include the following:

- a. Current IBRS or female urinary devices available to servicewomen, as well as options being evaluated. Provide pictures with detailed explanations.
- b. Provide the roadmap for implementation by FY23, broken down by quarter, annotating major milestones (e.g., initial production, final mass production, availability across the Services, and expert training).
- c. What is the planned funding and who is the specific Office of Primary responsibility (OPR)?
- d. What is your Service's plan to disseminate IBRS or female urinary devices (e.g., supply chain)?
- e. What training is provided once IBRS or female urinary devices are sent to installations?

RFI Response 7a:

A1. Low tech/low cost options for female aircrew are shown below. Relief bag (figure 1) used with a female adapter (Figure 2). The systems are easily stored but require unbuckling/release of restraint systems to raise the relief bag and funnel above the seat to be correctly positioned for urine collection in the bag.

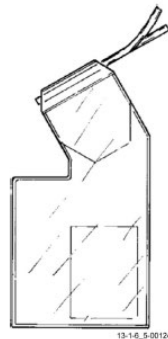


Figure 1. Relief Bag



Figure 2. Lady J and Freshette

A2. Aircrew Mission Extender Device (AMXD) Max and SKYDRATE. The AMXD series of bladder relief devices has been approved and in use by Navy and Marine Corps pilots for over 15 years. The system has been improved and the version currently in use by Navy and MC is the AMXDMax (Figure 3). The system consists of a disposable human interface (HI) worn by the aircrew (a pad for women and cup for men), a pump that is cleaned and reused and a disposable collection bag that stores the urine. The human interface is an external (to the body) product. The HI is worn under the flight clothing, with the connection to the pump routed in such a way so that the aircrew do not need to unstrap or reposition during flight to make use of the system. To reduce cost, the interface can be cleaned; however, this is problematic in a shipboard/deployed environment. Aboard ship the only places to clean the interface are the same sinks that are used for brushing teeth, washing faces, etc. Additionally, the pad would need to dry in the berthing space causing it to smell like urine. Some female aircrew have reported that the pad is uncomfortable and have reported issues with leakage. In many cases, the leakage is due to poor training. The AMXDMax does have a pass thru for installation on an anti-exposure suit that allows use of the system without trying to pull the hose connecting the interface and pump through the exposure suit relief zipper (the zipper is very difficult to open and close). The pass thru is unique to the AMXD system. The system is also expensive per use for consumable components. Currently the consumables of interface, hoses, and collection bag cost for women or men, are over \$500, according to GSA pricing. The collection bag can be reused which will reduce the price to \$400.

Figure 3: AMXDMax



The Navy is actively testing the next generation AMXDmax system, rebranded as SKYDRATE (Figure 5) for Navy and Marine Corps use. SKYDRATE has an improved pad design, added an in-line power switch and increased the capacity of the pump.

Figure 4: SKYDRATE



A3. The Navy has 2 systems in development through the SBIR program that also can be used without unstrapping from the aircrew seat. The purpose of the SBIR efforts are to develop a low cost solution that would improve comfort and performance. The objective cost for consumables in 2019 dollars was \$50/flight with a threshold of \$100. It is estimated that both of the solutions below will meet the threshold cost target. Both systems in development consist of a disposable human interface (HI) worn by the aircrew, a pump that is cleaned and reused and a disposable collection bag that stores the urine. The human interface is an external product. The government is developing a universal pass thru interface to allow use of new systems with an anti-exposure suit without routing the hose through the relief zipper.

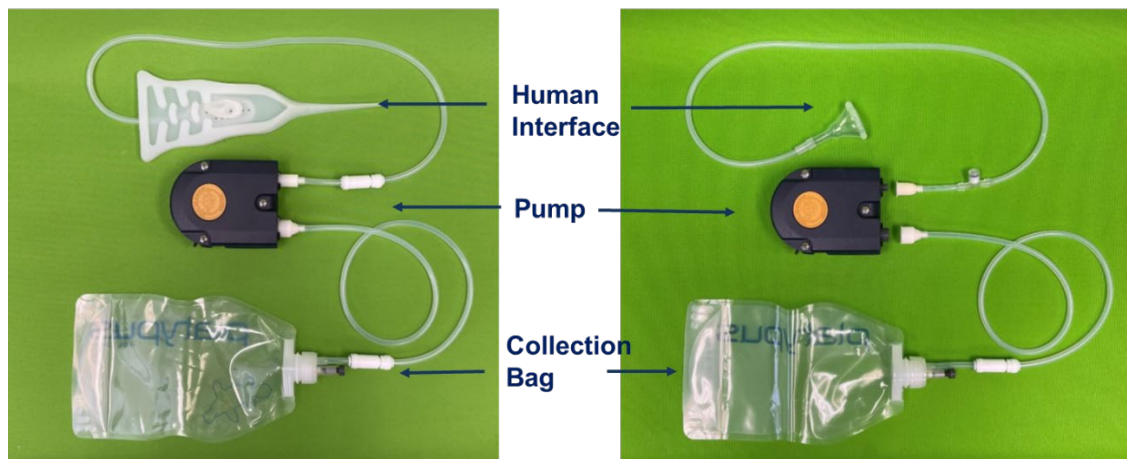
1. Materials and Technologies (MATECH) Aircrew Bladder Relief Device (ABRD).

The ABRD (Figure 5) system has a unique female interface that is put in place while dressing for a flight. The hose from the interface to the pump is stored inside of the undergarment. The pump and collection bag are stored in a pocket or helmet bag until needed. The hose from the interface is connected to the pump, a hose connects the pump to the collection bag which contains beads to create a gel when urine is in the bag. The pump is battery operated and rechargeable. Run the pump for 15 seconds prior to urination. There is no need to release restraint systems. The pump can evacuate urine approximately 10 times per charge. The collection bag can be replaced with a new bag to increase the number of voids in one flight. The pump does require cleaning with a chlorine solution prior to being stored for the next use. A tablet that is mixed with water is provided for cleaning.

The female interface is a unique design that is low profile and closely fits to the female anatomy. The men's interface is a modified condom catheter. Both interfaces are external to the body.

Figure 5: ABRD

### Aircrew Bladder Relief Device (ABRD)



2. Triton Systems Superior Portable Urine Relief System (SPURS)

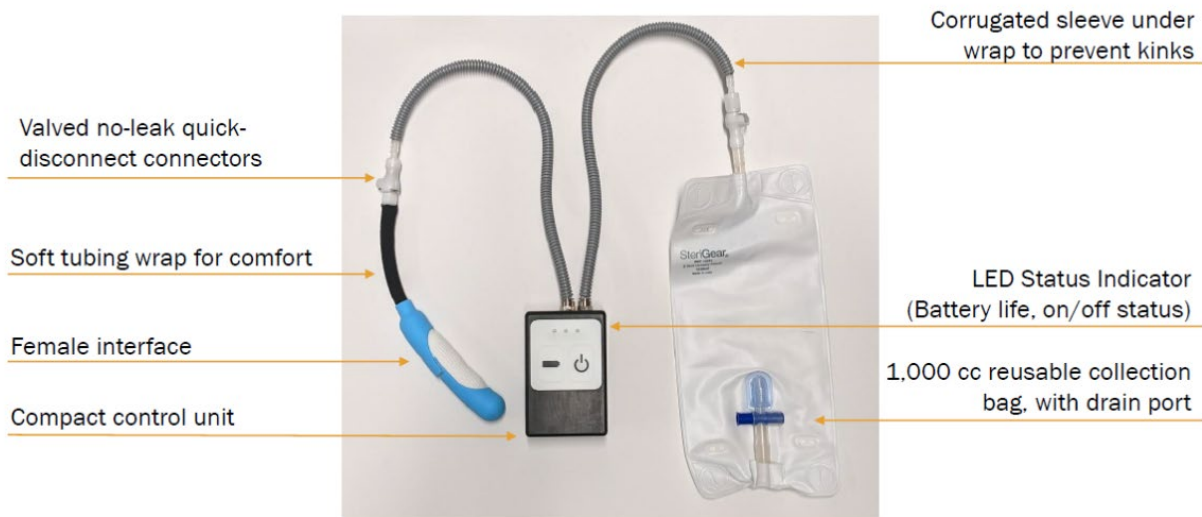
The SPURS system (Figure 6) has a modified commercial external catheter designed for women that is put into place while dressing for flight. The hose from the interface to the pump is stored inside of the undergarment. The pump and collection bag are stored in a pocket or helmet bag until needed. The hose from the interface is connected to the pump, a hose connects the pump to the collection bag, which contains beads to create a gel when urine is in the bag. The pump is battery operated and rechargeable. Run the pump for 15 seconds prior to urination. There is no need to release restraint systems. The pump can evacuate urine

approximately 10 times per charge. The collection bag can be replaced with a new bag to increase the number of voids in one flight. The pump requires cleaning prior to being stored for the next use.

A men's interface is currently in development.

The female interface of the SPURS system is a Purewick external catheter. The Purewick is widely used in hospitals and at home systems for urine incontinence. For use with Aircrew Life Support Systems worn by the aircrew, the Purewick was modified to make it shorter in length.

Figure 6: SPURS Female Configuration



#### RFI Response 7b:

A schedule is provided of the current bladder relief efforts managed by the Navy. Skydrate is the next generation AMXDMax system. The Navy has been testing the system for EMI/EME shielding. The concern is that signals emitted by systems on the ship will impact the operation of the system. This has been demonstrated in laboratory testing with the Skydrate failing to operate correctly after exposure to some frequencies. The results may limit the approval for shipboard use to aircraft platforms that provide shielding to the system.

Bladder Relief Development Schedule												
Task	FY 2023				FY 2024				FY 2025			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Skydrate												
EME Testing												
Flight Clearance												
Train the Trainer												
Fleet use												
MATECH												
Flight Testing												
Eng Revisions from Flight Test												
Pre-production Eng												
Basic Ordering Agreement												
Delivery Orders												
Production Delivery												
Train the Trainer												
IOC												
Sustainment DLA												
Triton Systems												
Qualification Testing												
Flight Testing: Female Interface												
Eng Revisions from Flight Test												
Flight Testing: Male Interface												
Pre-production Eng												
Basic Ordering Agreement												
Delivery Orders												
Production Delivery												
Train the Trainer												
IOC												
Sustainment DLA												

**RFI Response 7c:**

The office of primary responsibility is NAVAIR PMA202. Currently, FY-24 funding is planned for procurement of initial quantities of the MATECH and Triton systems that are in development. The planned funding will be used for training assets and a quantity for initial fielding that is to be determined. Prior years, PMA202 has purchase AMXD systems for fielding to aircrew that requested a system.

**RFI Response 7d:**

The initial purchase of the MATECH and Triton bladder relief systems will be distributed by the ALSS TYCOMs. Any purchase beyond the initial distribution will be by squadrons through a DLA managed supply. The initial purchase will use a Basic Ordering Agreement (BOA) which is a Phase III SBIR contract. The BOA will have delivery orders that can be used by the Navy/USMC as well as other services and programs. The development of the systems has been through an IPT with the Navy, Air Force and JSF. The USCG is now monitoring development, and the Army has shown interest.



The Navy and Marine Corps dissemination of existing bladder relief devices such as the AMXDMax, is currently supported through the components availability in the supply system. The USAF requested the NSNs and has submitted NSN requests for the updated SKYDRATE system.

**RFI Response 7e:**

The training is a key contributor to the successful use of a bladder relief system. Recent experience in developing new systems has identified the need for a crawl/walk/run plan for becoming familiar and comfortable with using a bladder relief system. Initial in-person training, followed by at-home use, and then use while wearing mission gear. Deploying without training is not setting the user up for success.

The low tech systems such as the funnel or relief bag rely on aircrew self-training in the use of those items. The AMXDMax/Skydate system training is supplied by the vendor. As part of the purchase of the AMXD systems the manufacturer, Omni Defense Systems, provides onsite training in the use of the system, at the request of the command. The training is provided at no cost.

To improve the availability of training for current and future bladder relief systems, the PMA202-funded FAILSAFE program is developing a train the trainer capability. The military personnel that are part of the FAILSAFE program will be trained in the use of the systems and will be provided the materials and samples to use for local on-site training. The suppliers of the systems have also developed training materials and aids.

Hours Expended Answering this RFI: 5.5 hours

POC or office responsible: NAVAIR