



NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION

2026 U.S. Navy & Marine Corps Aeromedical Top 10 Priorities

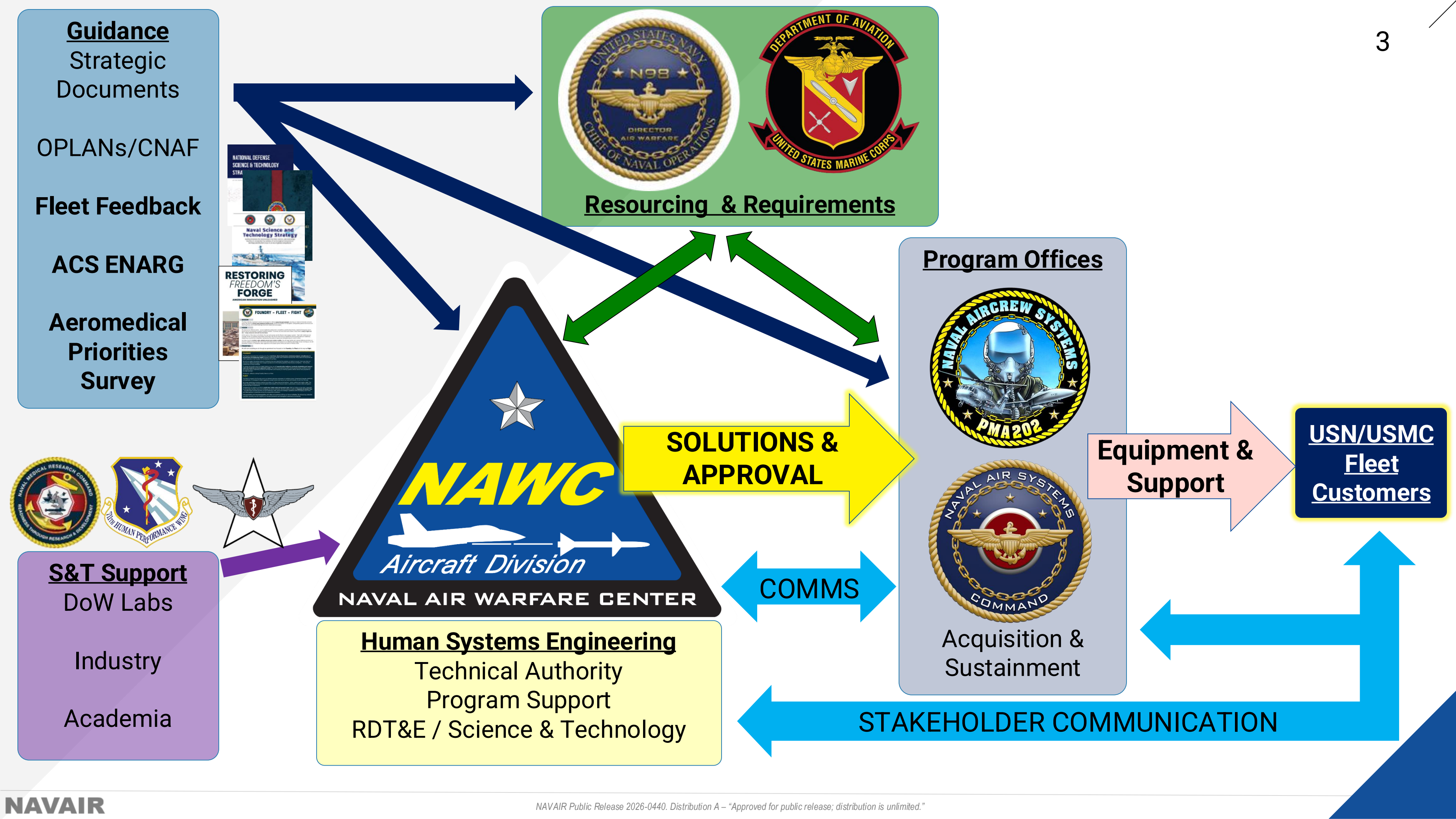
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Disclaimer

I have no financial relationships to disclose

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SYSTEMS ACQUISITION GROUP (SAG) HUMAN SYSTEMS ENGINEERING DEPARTMENT

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Systems Engineering & Integration Division

- Product Systems Engineering Branch
- Platform Integration Branch

Human Performance Division

- Manned Aviation HCI Branch
- Electro-Optics Branch
- Unmanned Aviation HCI Branch

Aircrew Protection & Survivability Division

- Helmet Systems & Auditory Performance Branch
- Body Mounted & Survival Systems Branch
- Crashworthy / Escape & Dynamic Test / Modeling Branch

Aeromedical & Life Support Division

- Aeromedical Research & Integration Branch
- Aeromedical Monitoring & Analysis Branch
- Life Support & Physiological Systems Branch

Research and Development: BA 1 – 4 R&D activities to improve warfighter performance, protection, and survivability

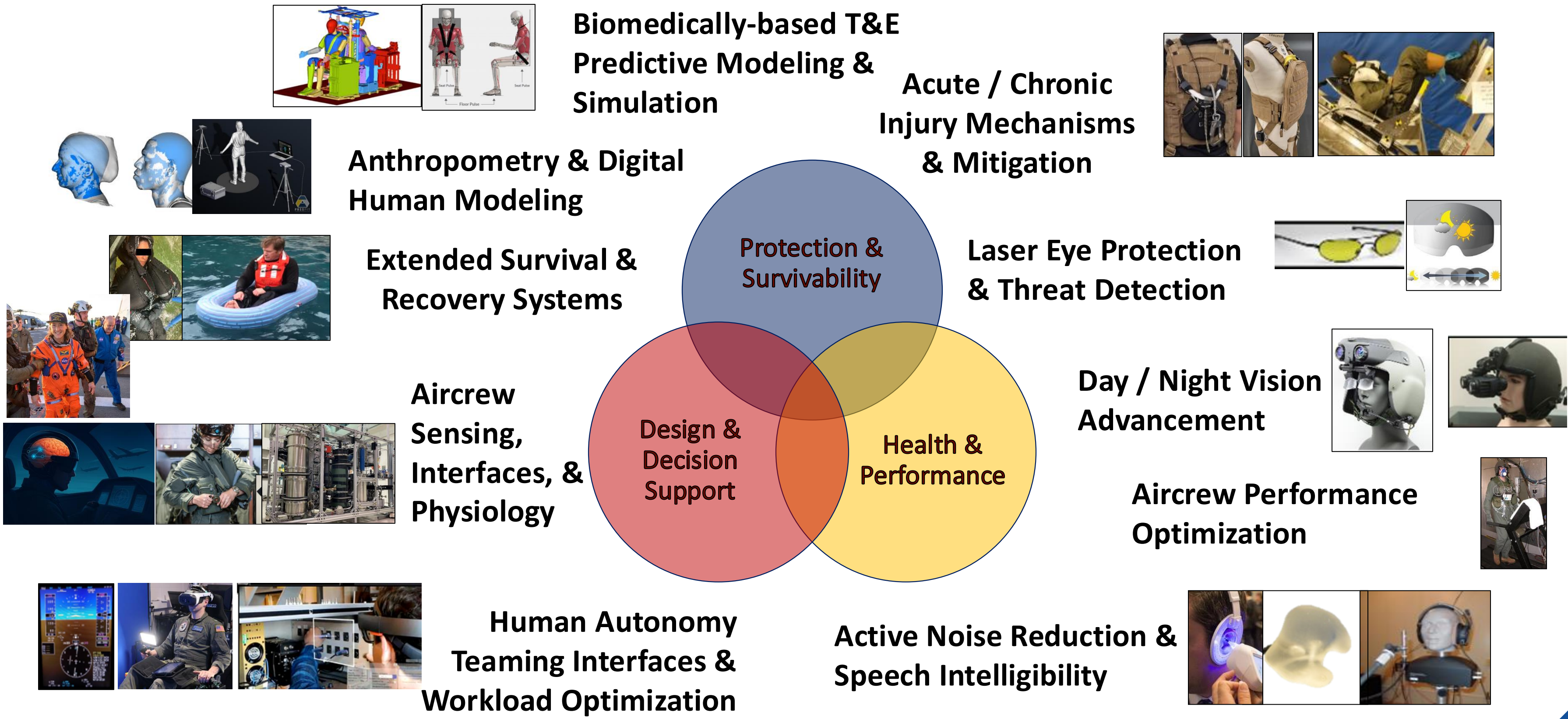
NORTH STAR
Deliver the human systems research and engineering support the Fleet needs to win, at a cost they can afford.

MISSION
Provide full spectrum life cycle human systems research and engineering expertise in warfighter performance, protection, and survivability.

VISION
To be the Human Systems Engineering center of excellence, trusted to address Naval Aviation's most urgent needs.

VALUES
Fleet Focus – The warfighter is at the center of everything we do.
Innovation – We continually challenge ourselves to improve how we get the work done to deliver capability to the warfighter more quickly.
Diversity – We embrace different backgrounds and perspectives.

HSE RDT&E Portfolio Overview



Aeromedical Priorities Survey

- Identify, align, and coordinate mutual AND complementary areas of research.
- Identify and define Aeromedical priorities / insights as capabilities aligned with program office areas of responsibility.
- Inform the Aircrew Systems ENARG from the Aeromedical perspective.
- Provide Aeromedical support / advocacy for key priorities to support ACS ENARG priorities.
- Help advocate for external research funds in support of HSE / Program Office portfolio.
- Help inform other stakeholders regarding Aeromedical Priorities: Aircrew Performance, Protection, and Survivability – e.g., CNAF / CNAL, N98, ONR, DHA, BUMED.

Aeromedical Priorities Survey

- 21 total questions (up from 19)
- Options 1 (Nice to have) to 5 (Must have) with opportunity to say N/A
- New this year, added based on PMA-202 ACS survey restructuring:
 - Improve ejection, crash survivability, and egress
 - Improve CBRNE gear
- 940 completed surveys
 - Fixed Wing Ejection: 253
 - Fixed Wing Non-Ejection: 126
 - Rotary / Tilt-Rotor: 561

2026 Aeromedical Top 10

Fixed Wing Ejection

1. Aircrew Neck & Back Pain
2. Long-term health impacts of flight
3. Hearing Protection
4. Personnel Recovery & Extended Survival
5. Ejection, Crash Survivability, and Egress
6. Aircrew Conditioning
7. Oxygen Mask Design
8. Physical Fatigue / Sleep Health
9. Speech Intelligibility
10. Dehydration Mitigation

Fixed Wing Non-Ejection

1. Hearing Protection
2. Aircrew Neck & Back Pain
3. Long-term health impacts of flight
4. Personnel Recovery & Extended Survival
5. Physical Fatigue / Sleep Health
6. Crash Survivability & Egress
7. Cognitive Fatigue Identification & Countermeasures
8. Aircrew Conditioning
9. Aircraft Habitability
10. Speech Intelligibility

Rotary/Tilt Rotor

1. Aircrew Neck & Back Pain
2. Hearing Protection
3. Long-term health impacts of flight
4. Speech Intelligibility
5. Physical Fatigue / Sleep Health
6. Aircraft Habitability
7. Personnel Recovery & Extended Survival
8. Spatial Disorientation/Degraded Visual Environments
9. Aircrew Conditioning
10. Cognitive Fatigue Identification & Countermeasures

2026 ENARG Top 5 By Platform

Fixed Wing Ejection

Aeromedical Priorities

1. Define requirements to address head/neck/back pain (e.g. Tactical Athlete Program)
2. Define minimum acceptable hydration & nutrition requirements for AOR
3. Update MIL-STD for seats/lumbar/head for endurance & MSK injury
4. Improve ejection/egress/crash survivability
5. Improve Hearing Protection

Aircrew Systems Priorities

1. Isolated aircrew rescue/recovery signaling
2. Desalination for extended survival
3. Improved life rafts
4. Improved anti-exposure ensemble
5. ALSS Inventory Management System

Fixed Wing Non-Ejection

Aeromedical Priorities

1. Define requirements to address head/neck/back pain (e.g. Tactical Athlete Program)
2. Update MIL-STD for seats/lumbar/head for endurance & MSK injury
3. Improve requirements for egress & crash survivability
4. Define minimum acceptable hydration & nutrition requirements for AOR
5. Hearing protection/sound dampening solutions

Aircrew Systems Priorities

1. Isolated aircrew rescue/recovery signaling
2. E-2D MAVRIC Seat
3. Establish MIL-STD for seat/lumbar/head cushion in FWNE aircraft
4. Desalination capability for maritime survival
5. Hearing protection continuum

Rotary / Tilt Rotor

Aeromedical Priorities

1. Define requirements to address head/neck/back pain (e.g. Tactical Athlete Program)
2. Hearing protection/sound dampening
3. Update MIL-STD for seats/lumbar/head for endurance & MSK injury
4. Define minimum acceptable hydration & nutrition requirements for AOR
5. Improve speech intelligibility for all crew stations

Aircrew Systems Priorities

1. Isolated aircrew rescue/recovery signaling
2. Improved life rafts
3. Improved rotor/tilt-rotor helmets
4. Night vision enhancement
5. Desalination capability for maritime survival

1. Neck and Back Pain

Research Gap: Identify the *causes of neck and back pain* and evaluate the *effectiveness of intervention(s)*, develop *improved aircrew / aircraft equipment* to reduce pain and injury.

What the Fleet Said:

- **Back / Neck / Shoulder Pain:** Many comments noting back, neck, and shoulder pain as the top concerns, citing **weight of vests, helmets, and NVGs** as primary contributors
- **Seat Ergonomics:** Many comments reference **poor ergonomics** with the seats across platform types
- **Prevention / Recovery:** Aircrew want more **preventative** and **supportive care** options including physical therapy, aircraft specific strength training, chiropractors, massage therapy, and dedicated exercise space

Representative Quotes:

“Investing in physical therapy and exercise/training programs that are accessible would go farther and have a faster impact than procuring new systems. Squadrons should have access to a physical therapist without needing to go through the lengthy referral process at medical.”

“The cause of these come from the inherent posture you maintain in the cockpit due to the design of the seats. You also inherently slouch when operating the sensor.”

“Physical health degradation due to bulky and heavy gear.”

2. Hearing Protection

Research Gap: *Characterize* the ambient noise environment; *determine tradeoffs* between attenuation, talk-through capability, active noise reduction, and *hearing conservation in protective/performance strategies*; include pharmacological protection where possible and improve compliance with better comfort (including with integrated communication systems).

What the Fleet Said:

- **Hearing Protection:** Fleet wants **Active Noise Reduction**, custom hearing protection, and custom communication earpieces
- **Overprotection:** Double protection which often makes it **impossible to hear and communicate**.
- **Availability:** Fleet needs easier access to **fitting & refit** of their CEPs; **faster turnaround time**.

Representative Quotes:

"Custom CEPs are quite valuable (depending on personal preference). It took me almost 4 years in the fleet before I was able to acquire them."

"The V22 is an incredibly loud aircraft, especially for the Aircrew inside the cabin. Even with double hearing protection, long flights definitely have an adverse impact on my hearing."

"Active noise cancelation would be a great to add as an option to our helmet hearing protection with CEPs."

"The E-2D is inherently very loud and when at high power settings, it is very difficult to communicate on the radio or ICS."

"The P-8 needs ICS so we shouldn't have to fly using only one side of the headset"

3. Long-Term Health Impacts of the Flight Environment

Research Gap: Conduct longitudinal and epidemiological studies on the impact of a career in the flying environment as aircrew or maintainer.

What the fleet said:

- **Known Impacts:** Many comments express significant concern over the known, but under-addressed, long-term health impacts of an aviation career, including **musculoskeletal injuries**, **hearing loss**, and **increased cancer risk**. Aircrew feel that studies are necessary not just for **prevention**, but to provide data to **support** VA disability claims.
- **Unknown Impacts:** Concerns raised about **TBI**, **cognitive decline**, and **impacts on reproductive health**.
- **Environmental Exposure:** A strong desire for more research into the effects of **vibration**, **radiation** from onboard systems, and exposure to **HAZMAT**, **fuel**, and exhaust **fumes**.

Representative Quotes:

"I was diagnosed with cancer. It would be nice to know if it is associated with flying."

*"The amount of vibrations that flyers are under in flight should be studied. **A 25-year-old should not feel like they have the spine and knees of a 50-year-old.**"*

*"I sit directly above one of the most powerful airborne radars ever created. **What is that radar doing to my body?**"*

"Make results readily available to aircrew so that they can begin implementing mitigation strategies in their lifestyles early in their careers to prevent large problems."

4. Speech Intelligibility

Research Gap: Develop solutions and conduct research on the intelligibility of speech over ICS and in operational environments (SAR, maintenance, interoperability). Examine novel communication systems for improved speech intelligibility.

What the Fleet Said:

- **Safety-of-flight concern:** with many comments citing **unreliable ICS, faulty microphones, and broken cords.**
- **Quality:** microphones are highly susceptible to **wind** and **environmental noise**
- **Tradeoffs:** connection made between poor hearing protection and poor communication.

Representative Quotes:

*"The current microphone set up on most all helmets within the fleet have a lack of wind mitigation and protection... Many aircrew are left to come up with their own solutions to improve them such as **electrical tape** or RTV/silicone which is not the correct answer."*

*"High priority. **Number one degrader of intraplane crew resource management.** If an H53 crew cannot intelligibly talk, using the onboard ICS, a crew is combat ineffective."*

*"Unclear radio calls are a massive safety of flight issue, and continuously **turning up the volume** to try to hear calls is damaging for hearing."*

*"The double-sided mics we've been issued have led to a **decrease in situational awareness** by requiring us as aircrew to break contact with the aircraft in a terminal environment to relay critical information regarding the safety of the aircraft and personnel."*

5. Personnel Recovery and Extended Survival

Research Gap: Investing in future search and rescue topics: cold water recovery and survival, SAR signaling capabilities, identification and recovery of personnel.

What the Fleet Said:

- **Survival: Desalination** options, **automatic** activation features (e.g., signaling device, LPU)
- **Equipment:** better **thermal control**, **reduction of weight** of gear, and concerns of gear **malfunction**.
- **Training: more training** on survival equipment desired

Representative Quotes:

*"Aircrew **need to have confidence** in their survival systems in order to fly the jet tactically and know that in the event of an ejection they are set up for survival."*

*"Come up with something that **inflates the LPU if the crew wearing it becomes unconscious** or after being submerged for a certain period of time so they don't just sink to the bottom of the ocean in a mishap"*

*"An unacceptable amount of Aircrew are **going to survive ejection but die from exposure** in a war in the Pacific"*

*"We are not equipped to spend more than a couple hours in a raft or on the ground...must have better equipment and training to allow us to **survive for days**."*

6. Physical Fatigue / Sleep Health

Research Gap: Identify solutions to improve sleep and sustain performance, non-pharmacological or pharmacological (e.g., crew schedules or environmental changes), research how individual differences influence sleep requirements.

What the Fleet Said:

- **Schedule/OPTEMPO:** Burden of **non-flying duties, irregular schedules, back-to-back flights**
- **Environment:** Poor sleeping in **operational environments.**

Representative Comments:

"The demands of the HMLA squadron and lack of available personnel have destroyed any hope I had of good sleep hygiene...The squadron view is that since they are not flying, crew rest no longer applies."

*"Sleep is primarily a culture issue. Aircrews often operate at a **full 12-hour crew day** and are expected to go day into night and then back for work schedules almost every week."*

*"The amount of stress that are put on aircrew continues to grow. **Sleeping on a carrier is almost impossible.**"*

*"**Most aircrew are fatigued.** This can result in flying in a deteriorated state. Eliminating collateral duties and filling them with Marines who own the MOS or civilian counterparts will lead to better pilots, safer flying, and less mishaps."*

7. Conditioning Programs for Aircrew

Research Gap: Investigate and develop programs for physical and mental conditioning of aircrew. Utilize research on diet and exercise to support aircrew and understand impacts to human performance. Research programming on resilience and operational stress specific to aviation.

What the Fleet Said:

- **Time, Resources, and Programming:** Lack of availability of time and resources for proper fitness & conditioning. Many feel that any new program is useless without a systemic change in workload.
- **Accessibility:** Demand for dedicated and easily accessible physical therapists, chiropractors, and athletic trainers at the squadron or MAG level, instead of more research.

Representative Comments

*"Every squadron should have a dedicated physical therapist and equipment. Improve manpower situations at squadrons to **allow time for physical fitness rather than 14-hour admin days** working on ground jobs that have entire MOSs dedicated to them in other military units."*

*"Fighter aircrew are by FAR the most expensive asset in terms of cost to train and equip that the US military funds. They should be treated as though they are worth the 10+ million dollars it took to get them to a fully combat capable state... They should be **treated closer to professional athletes than blue collar pilots.**"*

*"**Conditioning programs sound great on paper** but aircrewman are also maintainers and there is no feasible way to pry them from the flight line. **Maintenance will always take priority over extracurricular aircrew training.**"*

8. Ejection, Crash Survivability, and Egress

Research Gap: Conduct additional research on ejection sequence, crash-worthy seating, and aircraft egress.

What the Fleet Said:

- **Confidence: Lack of confidence** in surviving a crash (esp. underwater egress); egress hindered by **bulky** gear/cords
- **Training: Infrequent** and **unrealistic training**
- Concerns exist regarding **NFO survivability in the event of an E-2 crash**, with requests for further study and potential solutions.

Representative Comments:

"Egressing the AH-1 is incredibly difficult."

*"It seems to me if you go under water in a helicopter your odds of survival are incredibly low... the **aircraft will be a mile under water by the time all violent motion stops**. That's a really long swim to the surface with lobes that won't carry you there and forty pounds of survival gear and PPE on your body."*

9. Aircraft Habitability

Research Gap: Examine ways to improve the environment in the aircraft, such as improved environmental cooling/heating technology, exposure to gases or fluids and impact to health, and future protective textile materials for flight gear.

What the Fleet Said:

- **Environment:** Ineffective, broken, or non-existent **Environmental Control Systems** (multi-platform concern); **ergonomic complaints**
- **Equipment:** more **2-piece flight suit availability**
- Aircrew report frequent **exposure to hydraulic fluid** in the cabin of the MH-60S and have concerns about the associated health risks.

Representative Comments

*"The CH53E is a miserable aircraft to operate for extended periods of time. No environmental control, it's a greenhouse and **I've measured the temperature inside at 140 deg.** We regularly conduct missions in this environment for 6+ hours. It is absolutely a degrader."*

*"I think part of the reason many rotary wing aircrew experience **chronic back pain is due to the seats.**"*

10. Cognitive Fatigue

Research Gap: Conduct research on methods of mitigating cognitive/mental fatigue in flight and mental endurance of aircrew. Research human performance in longer duration flights/missions. Examine what specific mental tasks are most impacted by fatigue and quantify impact to mission. Utilize cognitive fatigue research in scheduling and develop cognitive fatigue mitigation strategies.

What the Fleet Said:

- **Causes:** long-duration missions, environmental factors like extreme heat (due to broken ECS), and **high task saturation**.
- **Mitigation:** that increasing flight hours and proficiency is a key countermeasure

Representative Comments

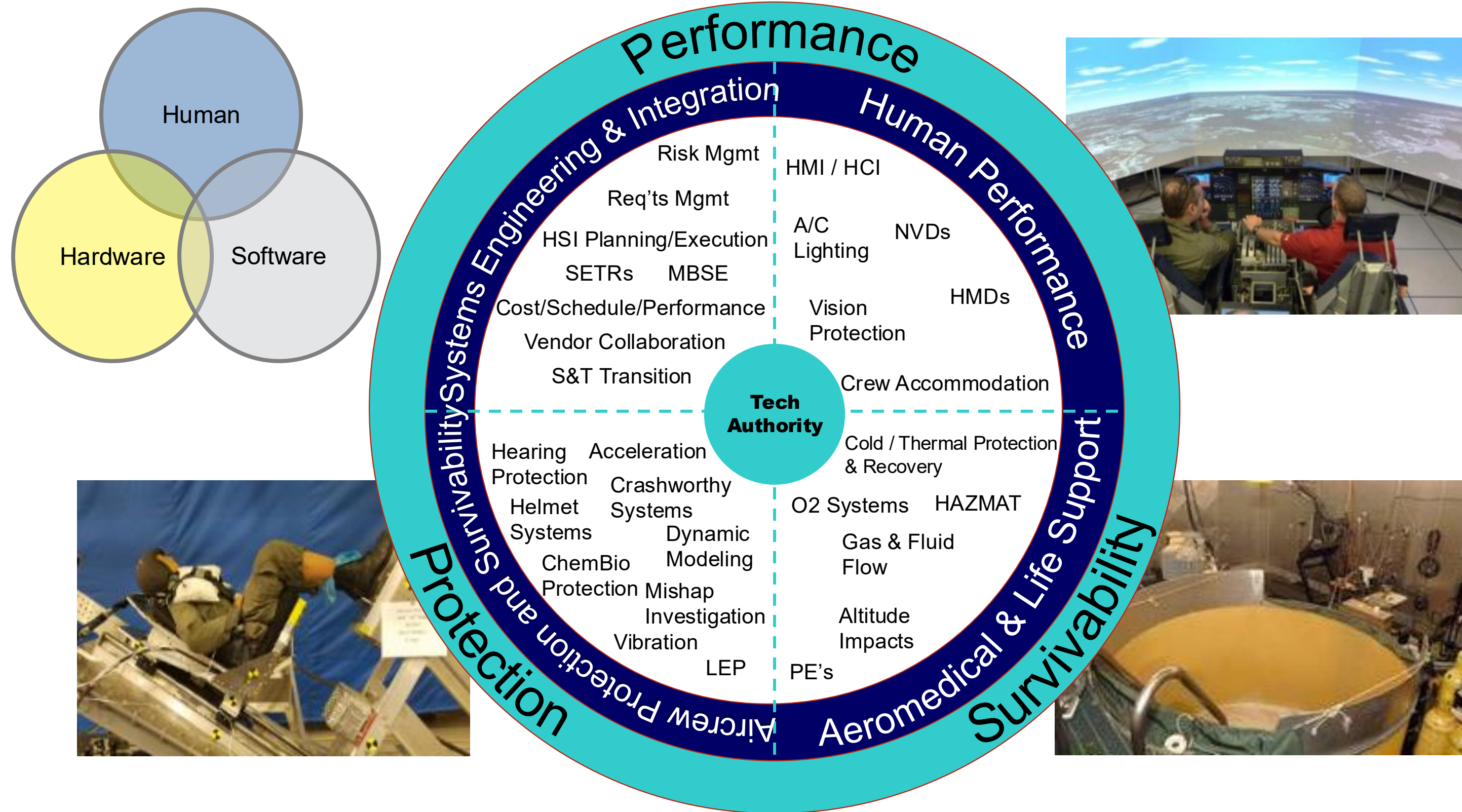
"Fatigue is one of the greatest risks we face today that could result in a mishap. It's very important to know how to combat it safely and effectively."

*"Pilots have the ability to rotate out 1 of the 3 pilots. **Aircrew are required to be in the seat the entire duration of the sortie.** And even in the transit, there is **no way or place to rest** that won't be a hazard to back pain or general posture."*

"Aircrew loading will only increase with the rise of interoperability and unmanned systems. We should develop ways to reduce cognitive fatigue before it becomes a problem."

*"**E-2D aircrew are starting to fly significantly longer missions without much community experience.** Studies to identify/prevent fatigue better would be very beneficial as these missions are becoming the norm."*

Thank You!



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