1. Physiological Episodes (PEs) remain my number one safety priority across the force. Although the rate of overall PE events has been trending down slightly since my May 2016 P4, NAE leadership and I are very concerned with a recent increase in ECS/pressurization related PEs for the legacy F/A-18 A-D fleet, as well as cockpit over-pressurization events on deck for F/A-18 E-G aircraft. PEs are a complex problem set that have challenged our ability to determine root cause for the failures and we aren’t there yet. As I said, this is the NAE’s number one safety priority and focus area, and we are taking a "resource unconstrained" approach to the problem, meaning our efforts to find a solution will not be constrained by manpower or cost. I know we have the right people (NAVAIR program managers, engineers, maintenance experts and my Type Commander teams) immersed in this effort, doing everything we can to solve this problem, as fast as possible, along multiple lines of effort. Although we don’t have a "smoking gun" for any of our broader PE categories yet, I have confidence that the mitigations we’ve taken and the longer term solutions we are working will allow us to safely execute our assigned warfighting missions. For the updates that follow, I have grouped PEs in two general categories problems with ECS/pressurization and OBOGS/breathing gas.

2. Aircraft cabin pressurization problems (fluctuating pressure, over pressurization, and rapid decompression) are predominantly occurring in the legacy F/A-18 fleet (5 x the rate of cabin pressure PEs than Rhino) and may be directly related to the aging ECS. Many specific engineering solutions and mitigations have already been completed and implemented based on what we have learned from reported incidents thus far. In July 2016, we sent a team of NAVAIR engineers to work directly with VFA-
37 and inspect one of their aircraft that experienced ECS malfunctions leading to multiple PEs. It is now standard protocol that every aircraft that experiences a PE event is down for maintenance until all the ECS and aircrew life support components suspected to be causal are removed and submitted for engineering investigations. In addition to implementing this standard protocol, we also transferred one of VFA-37's "problem" aircraft to Patuxent River for in-depth testing by our engineering experts. The findings from those ground and flight tests have helped inform our understanding of legacy F/A-18 pressurization issues. Based on extensive testing and engineering analysis, we have changed the maintenance criteria for ECS valves and sensor components, accelerating forced removal and replacement of parts after a certain number of flight hours, rather than flying to failure as we'd done in the past. We have also directed more regular aircraft system tests and diagnostics, thorough material condition inspections of the entire ECS, fault isolation of components such as the Cabin Air Exit Valve in legacy Hornets, manufacturing and repair quality assurance oversight, and component design changes. Additionally, we are working directly with the fleet to ensure we have complete transparency and information flow to adequately mitigate the risks of PEs, improve our analysis efforts following a PE, minimize the physiological impacts to aircrew and ultimately resolve the issues altogether. Based on inputs from the CO of VFA-37, and in coordination with the CO of VFA-34, we have provided aircrew in both those deploying squadrons with hypobaric recording watches that will alert them real-time of a cabin pressurization problem. Additionally, we have supplied them with "slam sticks," electronic barometric recording devices, that attach to their flight gear and accurately measure changes in cockpit pressurization. Both of these devices will more fully inform post-flight engineering analysis, and will allow us to quickly tailor any medical treatments should a DCS event occur. We are outfitting all legacy Hornet squadrons with the same gear and will follow by ordering slam sticks for all our F/A-18 E-G squadrons. Most importantly, we have installed Transportable Recompression Systems (TRCS) with embarked technicians onboard USS GEORGE H. W. BUSH and USS CARL VINSON that will enable any and all DCS symptoms to be treated promptly. DCS symptoms are significantly improved when medical treatments are quickly administered, and these portable chambers provide that immediate medical care in the event of a PE. Recent Rhino cockpit over-pressurizations on deck also have our full attention and led to the promulgation of new emergency procedures to address the problem. There can't be any question or delay about executing those procedures as soon as an abnormal cockpit pressure is felt or observed on the cabin altimeter. PMA-265 and the NATOPS model manager are working together to better define specific cabin pressure limits and/or restrictions, and I expect those to be published very soon. Of note, the EA-18G that had the recent over pressurization on deck at Whidbey Island appears to have been caused by ice that formed in the ECS sensing lines following an aircraft wash. Corrective maintenance procedures, as well as new aircrew EPs, have been put in place to mitigate that risk.

3. Breathing gas problems related to the aircraft's OBOGS - insufficient oxygen (flow/pressure/concentration) or contaminated breathing gas (leading to hypoxia) - still comprise the majority of our PE events (and the ones we see most in T-45s and F/A-18 E-Gs). Aggressive efforts to upgrade components and the materials used to detect "bad air" are in work, however, we do know that component failures as well as flow/pressure/concentration problems are generally accompanied by warnings from the aircraft, and manual activation of emergency oxygen is very effective. We must continue training to those procedures in our annual ROBD simulators. Our challenge is contaminated air, for which we currently have no warning system. Contaminated air can reach the aircrew through the OBOGS or normal cabin air provided by the ECS (if mask is off while on deck/ground with canopy closed). To better understand what those contaminants are, portions of the fleet are flying with sorbent tubes that collect hydrocarbon particles for further analysis at Patuxent River, and we are working to expand the availability and use of sorbent tubes across the force. Contaminant collection efforts will be expanded later this year with a device similar to the sorbent tubes that will allow immediate post-flight analysis at the squadron level. Until we fully understand
contamination, our goal (partnering with ONR and academia) is the development of a small, lightweight physiological monitor that will detect degraded performance and provide immediate warning to the aircrew, but we are still a few years from that solution.

4. As your Air Boss, I am fully prepared to limit or curtail flight operations if our fleet leadership team determines the risk to you - our aircrew - cannot be mitigated to an acceptable level. Based on the extensive data provided by the engineering and maintenance experts, and informed by fleet aviation leadership, I believe we have mitigated the PE risk to a level that allows us to continue operations, collect the data needed to further our analysis, and eventually resolve pressurization PEs.

5. We are working diligently to determine all the root causes of PEs and find solutions, and we will continue to aggressively prioritize resources and engineering efforts. Alert aircrew remain our best line of defense against PEs. Your awareness and immediate actions at the first signs of something "not quite right" are critical, leading to safe aircraft recoveries and the identification of key causal factors. Please continue your focused simulator training, review of PE immediate action items at every brief, and maintenance efforts to identify ECS and OBOGS systems that are not performing to standard. I welcome and encourage any additional fleet comments, recommendations or concerns. Please forward those via your chain of command or directly to my Force Safety Officer, CAPT "Fish" Fischer, (619) 545-2785 or john.fischer@navy.mil.

6. I continue to be awed by the extraordinary work you and your teams are doing every day across the force, especially those forward deployed. I know you all are committed to the mission, and the NAE leadership and I are committed to doing everything in our power to allow you to safely continue those important missions. You have my word that we will continue to focus all of our NAE efforts on this problem, and until we have completely eliminated the PE risks across the force, this will remain our #1 safety priority.

7. Fly, Fight, Lead! Air Boss sends. // BT

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