



## **FLIGHT SURGEON FLYING OPERATIONS GUIDE**

The mission of Flight Medicine is to promote and maintain the health and well being of the aviation community by assessing the safety of the occupational environments. The flight surgeon and his staff ensure a fit and ready fighting force through the use of prevention strategies. They prepare medical forces for rapid mobilization and deployments for Air Force contingencies worldwide. The flight surgeon is required to deploy with their flying squadrons, train medical personnel, prepare and maintain mobility equipment, conduct facilities and Aircrew Flight Equipment (life support) inspections, actively participate on the flying squadrons commanders staff, maintain the health of the aircrews and their families and be current and qualified in the unit assigned/attached aircraft. Flight surgeons assigned or attached to a flying unit are considered the human factors experts for their specific airframe. This expertise is especially critical for mishap /accident boards, and when processing aeromedical summaries for waivers, where complete understanding of the flight environment is essential prior to recommending an aeromedical disposition.

There are multiple requirements for the flight surgeon to accomplish prior to flight. The flight surgeon test has been incorporated into the annual requirements (AFI 11-202V1 3.11, 1 Mar 2013) to ensure the safety and familiarity of the daily operations of each rated flying member. This test incorporates more than aircraft specific information. It encompasses the entire aviation and human factors environment. As one of five rated officer positions, the flight surgeon must be familiar with airfield procedures, flying terminology and USAF regulations used by the aviation community in addition to the medical and human factors aspects of the profession. Pertinent flying AFIs includes AFI 11-201, 11-202 v1-v3, 11-401 and 11-402.

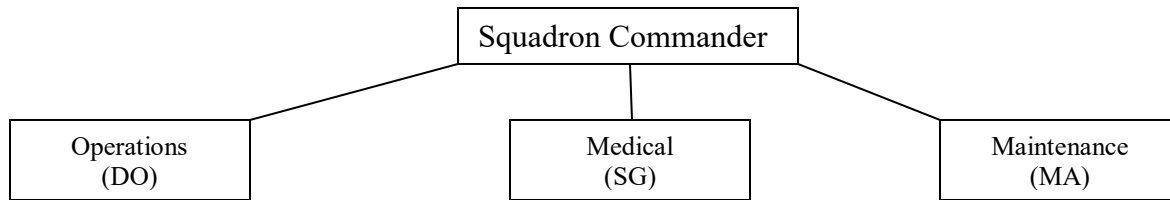
The assigned and attached flight surgeons will have every opportunity to fly in the unit's primary mission aircraft (AFI 11-202V1 3.11). As rated officers, flight surgeons are authorized to fly on any mission to include; practice emergency procedures, combat, and night vision goggle (NVG) flights. Aeronautical orders should reflect each airframe in which you are qualified as a crewmember. Flight surgeons are also required to maintain current 1042's, physiologic chamber cards, life support training, anti hijacking training, ground egress, crew resource management (CRM), operation read file cards (FCIF), mobility requirements, and medical credentials.

Flight surgeons are required to fly 6 sorties (1 night sortie) semi-annually and 12 sorties (2 night sorties) annually. 50% of these sorties are required to be in the primary assigned/attached aircraft (AFI 11-202V1 4.12). In addition, they need to fly four hours a month primary time while at home station or deployed or at least every 60 days. When flying for currency and pay, flight surgeons must log primary time. The following information is an overview of a standard flying squadron and its ground and flight operations. Due to the numerous airframes that flight surgeons are assigned to, it is impossible to be all-inclusive. In addition, each Base, Wing, and Major Command has various different regulation and procedures that provide important guidance for their flying communities and flight surgeons.

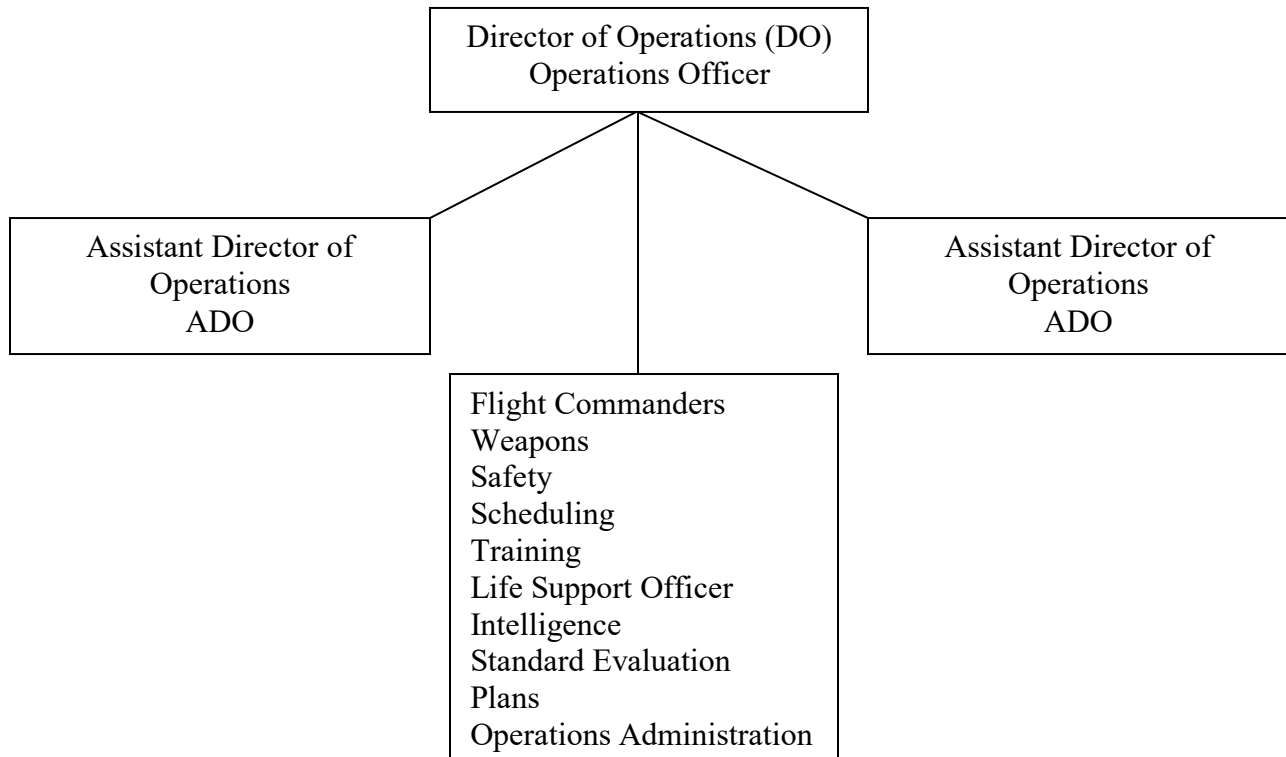
# Flying Squadron and Ground Operations

## Squadron Organization

### Basic Flying Squadron Organization



Flying Squadrons have two main divisions and a small medical element. The Squadron Medical Element usually reports directly to the flying squadron commander, with the assigned flight surgeon being the element leader (AFI 48-149, 2.5, 25 Jan 2013). The SGP is tasked with coordination with the flying squadron commander. The “OPS officer” or DO runs operations or “OPS”. This involves the planning and flying of the sorties or missions and therefore is where the pilots are located. The maintenance division is lead by the Maintenance Advisor or MA. This division manages all the maintenance issues within the squadron. The USAF has separated a majority of its Maintenance sections into combined maintenance groups no longer under the direct command of the Flying Squadron Commander.



The above figure is a rough guide on how the operations division will be arranged. The exact wiring diagram may vary depending on the wishes of the commander. The above functions are represented and are mirrored in the Wing.

**ADOs** - The OPS Officer (Director of Operations) will often have a couple of assistants called assistant directors of operations or ADOs. The DO is usually a LtCol. or senior Major and often a candidate to become a squadron commander. The DO often serves as the deputy commander. The ADOs are often majors or senior captains and candidates to be DOs.

**Top Three** is a function where a senior pilot staffs the operations desks and supervises flying activities for the squadron. Top three is usually limited to the squadron commander, DO, the ADOs, and very senior captains. There are usually more than three assigned to this duty. Whenever aircraft are flying, “Top Three” should be available at the OPS desk.

**Supervisor of Flying (SOF)** - This is a flying officer (Pilot) who is stationed in the Tower and maintains communications with aircraft in the local area. The SOF advises pilots with mechanical problems while in flight, assists with checklist activities, weather, in-flight emergencies (IFE) and other flying issues. Usually only mission ready and experienced pilots are able to perform this duty. A SOF must be available when flying is occurring.

**Flight Commanders** - Provides leadership for the Flight. Flight Commanders are an integral part of the squadron commander’s team. They handle the personnel issues of their assigned pilots. They are usually senior captains and are experienced in the aircraft. They are also involved in training, scheduling, and the mission planning of the pilots assigned to them.

**Weapons** - The weapons officer is involved with the employment of the aircraft and the various weapons it uses. Parameters of utilization and tactics are all handled in this function.

**Safety** - Handles safety issues for the squadron. It is often divided between flying and ground safety.

**Scheduling** – A Very hard job, often occupied by 2-3 people. Hours flown by the squadrons affect the budget of the entire wing. The program involves both the numbers of sorties flown and the duration of the sorties (ASD). Currency and training requirements need to be scheduled and maintained for all pilots. This is often very complex.

**Training** - Tracks training requirements and develops continuation and upgrade programs.

**Life Support Officer** - Supervises Aircrew Flight Equipment (life support) shop and all associated issues.

**Intelligence** – This is not a flying officer. It maintains important information about threats, enemy capabilities and current tactical and strategic situation. Processes security clearances and maintains classified AFI’s and OI’s.

**Aircrew Standardization / Evaluation** (Stan Eval) - This office evaluates items including flying to be sure Wing and Squadron standards are being followed. SEFEs are Standardization Evaluation Flight Examiners who conduct annual aircrew check rides.

**Plans** - This office tracks and coordinates plans for operations with the wing for the squadron.

**Operations Administration** - Support for the operations desk that tracks daily flight activities.

## **Types of Pilots**

### **Mission Qualifications**

**Mission Qualified (MQ)** - graduates come from training units mission qualified and have to complete the mission qualifying training (MQT) to graduate to either of the below.

**Mission Ready (MR)** - fully trained to fly a combat mission. **Mission Capable (MC)** - is a subset of this utilizing fewer flight hours.

**Flight Leads** - Mission ready and qualified to lead 2 or 4 ship flights.

**Mission Commanders** – They are capable of leading larger packages.

**Standardization Evaluation Flight Examiners (SEFE)** – These are pilots who evaluate wing pilots for following Wing standards.

**Instructor Pilots (IP)** Instructs students and prepares them for upgrades.

## **Ground Operations**

### **Flying Schedule**

Scheduling prepares a rough template of the type of sorties to be flown for the entire year. The OPS officer meets with the MA weekly and fine tunes the flying schedule in two week increments. The number of sorties and the required configuration of the aircraft are determined in this meeting. Maintenance decides which particular aircraft to use to fulfill a requirement on the schedule. Maintenance decides which aircraft to use based on total hours flown on a particular aircraft (that determines inspections and other maintenance work) and aircraft configuration concerns.

Schedulers, with input from leadership, schedule aircrew to fly the various sorties. This schedule is modified repetitively based on aircrew concerns, weather, deployments and aircraft availability.

### **Preparation to Fly**

The Mass Briefs are held at the start of each major “Go” (launch). The Mass brief covers standard items that will be utilized by each sortie (weather, NOTAMS (notices to airmen), safety items, and intelligence information). This brief is usually several minutes to hours prior to the individual flight briefing and lasts about 15 minutes. NOTAMS provide current information

about runways, air restrictions, new frequencies and other information that has changed or has been update by the Air traffic control agencies.

Prior to the mass brief, the flight surgeon should make sure he is up-to-date on all his requirements. These include FCIF's, OPS notes, and Safety Read File.

The flight brief usually starts about 2+30 before the take off time, but varies with airframe and mission. This is not usually the "show time" (time the Aircrew member arrives to begin aircrew duties, i.e. preflight/ mission planning). The flight brief covers the specifics of the flight. Step time (going to the aircraft) is usually 60 minutes prior to take off with 20 minutes to start, 20 minutes after start until taxi, and then 20 minutes until take off. This allows adequate time to preflight the aircraft, work maintenance problems and other issues. Prior to "stepping to the aircraft" the flight members "sign out" at the OPS desk to signify that they have completed all requirements prior to flying (FCIFs, OPS notes, Safety Read File, AF 1042 current). The Flight Surgeon is also required to sign out.

### **Aircrew Publications**

Many publications exist and are utilized by aircrew to accomplish their mission; the approving authority routinely updates most of these. Briefing rooms are to have current publications that are correctly updated. Also, the squadron standardization evaluation officer should have a list of all required changes on key publications. Handwritten changes are made as dictated by the appropriate authority. When enough changes have been made, the publishing authority often produces a new edition incorporating all the previous changes.

This section will describe the standard publications used to operate an aircraft. Many **SECRET** publications are maintained throughout the Wing that pertains to tactics, weapons parameters and these will not be discussed. Also there are various other publications that are not classified such, as the Air to Air Refueling Checklist, but this introduction will cover the major or commonly used ones.

**Dash-1** - This is the owner's manual of the aircraft Standard procedures, operating parameters, emergency procedures, and performance data are all displayed in great detail. This manual is updated periodically.

**Aircrew Checklist** - This is a simplified and abbreviated publication of the DASH-1. The largest section is on emergency procedures. It has write-in changes and complete updates periodically. All aircrew, including flight surgeons, are expected to have a current checklist with them when flying.

**In-flight Guide** -This is a particular publication to the Wing that is updated routinely. It covers items unique to the mission, aircraft, and local operating environment. It also is required by aircrew including flight surgeons when flying. It contains local procedures, radio frequencies, navigation information, and other information.

**Navigation Publications** - There are several types of navigational publications in the jets. These periodically expire and need to be replaced. The flight surgeon needs to have a basic familiarity with these documents.

1. IFR Maps - Display standard routes between navigational devices used in IFR flight.
2. Approach Plates - Display approaches to airports for use in bad weather or degraded visibility.
3. Supplements - Other info of importance used when flying IFR.

### **Aircrew Flight Equipment (Life Support Equipment)**

Life Support equipment and its correct use is essential to the safe performance of flying duties. Each squadron has a life support officer to work these issues and perform egress training. Typically each active flyer does egress training every six months and water survival as required per specific MDS (air frame). We will discuss some of the major pieces of equipment as they are typically put on by the aircrew.

**Anti Exposure Overalls (Poopie Suit)** - This bulky hot piece of equipment is designed to protect aircrew from cold water or air. There is a newer type and an older one still in service. The new one must be worn either with a liner or over the standard flight suit with long underwear. The old style must be worn under the standard flight suit. Large boots and other special requirements are needed to use the poopie suit. The Wing uses the poopie suit based on ocean water temperature.

**Combat Edge** - This is a positive pressure unit that is used to decrease the fatigue of high G flying. It includes a special mask, helmet, vest, and connector to the oxygen regulator. The oxygen regulator must be compatible with the system.

**G - Suit** - This device, worn on the abdomen and legs, is inflated to help with G tolerance.

**Survival Vest** - This vest would contain a side arm in war, but routinely does not during normal operations. It contains the PRC 90 or survival radio, flares, signaling mirror and other survival equipment. Flares, mirrors, or reflective aircraft parts are all excellent devices to use for signaling rescue aircraft. Some survival vests and packs contain water. Sea water, blood, fish juice and urine are not safe substitutes when trying to survive.

**Parachute Harness** - This is the last piece of equipment put on prior to stepping and includes the life vest (horse collar) for a water landing. Be sure the leg straps are secured prior to flying!

**Helmet** - The Combat Edge Helmet is special because of the mask and the bladder in the back of the helmet. They are much more expensive than the regular helmets.

**Flight Gloves** - These are made of Nomex like the flight suit and are a barrier to fire. They must be worn at all times when the engine is running.

**Night Vision Goggles (NVG)** – NVG's are becoming a standard piece of equipment in many Air Force aircraft limiting the amount of dark adaptation required. Dark adaptation of the eye develops slowly over a 20 to 30 minute period, but can be lost in a second with exposure to bright light. If the pilot closes one eye during a brief exposure to bright light, the closed eye can retain its dark adaptation. At reduced environmental light levels and while viewing the NVG intensified image, the human eye is in the intermediate vision state referred to as mesopic vision. During NVG operations, aircrew are using mesopic vision and therefore aircrew should allow approximately 10 minutes prior to relying on unaided vision for reliable cues. During NVG flight, decreased illumination level, increased cockpit workload and fatigue may contribute to spatial disorientation. NVG's are designed to maximize the available near Infrared energy present in the night sky. NVG's are sensitive to portions of the visible spectrum (0.4 to 0.7 microns) and near infrared spectrum (0.7 to 3.0 microns).

## **Briefing**

Many squadrons perform mass briefs prior to each "Go". After the mass brief each flight will then perform an individual brief prior to flying. This brief will discuss "motherhood" (standard items such as departure, arrival, overview of the mission, special interest items) and then will discuss the core or major part of the mission. This brief can last over one hour. The brief will break with enough time to put on flight gear prior to step time. The "line-up card", which is usually completed by the pilot during mission planning that takes place prior to the brief, is discussed. Other important issues to consider during the pre-mission brief includes adequate water available for all on board, proper clothing requirements for in flight and survival and flight line hearing protection. Hearing protection is required for all aircrew and passengers. Usually the card contains a flight or mission overview. This is very useful for the flight surgeon to know, as it gives him the "big picture" of the mission. It will cover type of take off, departure, arrival, and specifics of the mission. The rest of the card is used for mission specific items. The flight surgeon should pay particular attention to items such as fuel limits, G capability, and altitudes.

## **Pre Flight Check**

The Pre-flight check is performed by the pilot and/or the flight engineer. The flight surgeon should proceed to get into the aircraft and get strapped in so that the pilot can concentrate on preparation for the mission. When stepping to the aircraft avoid walking or driving over unbroken **red lines** on the pavement. These indicate secure areas than can only be entered through controlled entry points (usually delineated by a broken red line or markers).

### **Example: Pre Flight for F-16**

The flight surgeon should:

Check that all life support equipment needed is with him and in serviceable condition

Fasten leg straps on parachute harness

Zip G pants

Check seat is safe prior to getting in

Check that all safety pins are removed and stowed

Inspect seat and oxygen regulator  
 Strap in (Belt / Kit / Harness / G Suit fasten)  
 Oxygen regulator set (PRICE Check)  
 Attach helmet and communications cord  
 Intercom switch - Hot Mike / Volume High  
 Radios On squelch  
 Ejection seat handle in AFT (armed) just prior to entering the active runway

## **Radios**

All Air Force Aircraft are usually equipped with at least two radios, UHF and VHF.  
 Frequencies can be preset or dialed in manually.

There are predictable radio calls throughout a mission. The flow is generally like this:

<b>Call</b>	<b>Purpose</b>
Check In	Check in all flight members
Other Checks	Check Have Quick / Secure Radio Communication Systems, weather
Ground Taxi	Taxi to active runway
Tower	Clearance for Take off
Center	Flight Control Radar Separation in IMC Conditions (canceled in VFR)
GCI	Flight to range / mission work / RTB
Squadron OPS	Maintenance status of Jet (Code 1 (no problems), 2 (Problems but flyable), or 3 (Cannot be flown until fixed))
Approach	Radar Separation into Base
Tower	Clearance to Land
Ground	Taxi to Parking

## **Taxi**

The aircraft are taxied from the aircraft parking area to the active runway under the control of a specific ground controller. Those aircraft that need to arm weapons will taxi to an arm-up area at the end of the runway where weapons crews will arm any carried weapons and perform final checks on aircraft systems. A flight will often receive its departure clearance while taxiing to the runway.

The aircraft is most vulnerable to being hijacked when the crew is on board and the aircraft is operationally ready for flight. It is essential to exploit any opportunity to overcome a hijacker physically with force to include the prudent use of firearms.



## **Flight Operations**

### **Departure**

Most fixed wing departures are done under IFR (Instrument Flight Rules). During IFR flight the air traffic controller has tight control over the aircraft. The ground controller dictates altitudes, headings and speeds and is responsible for keeping the flight separated from other aircraft in the area. The controller gives altitudes in Mean Sea Level (MSL). MSL is based on Barometric pressure. This is not the same as Above Ground Level (AGL) that is read from the radar altimeter. For example, if your aircraft is sitting on a runway on top of a 5000 foot mountain, the Barometric altimeter would read 5000 feet MSL and the radar altimeter would read zero (0) AGL. There are standard departure routes described in the IFR charts. Often in good weather the pilot will cancel his IFR clearance shortly after take-off and proceed under VFR (Visual Flight Rules). In VMC (Visual Meteorological Conditions) the pilot is responsible for separation of his flight from other aircraft in the area and has much more freedom to proceed as he wishes.

### **Aircraft Instruments**

To permit operations with no visual references to the ground, horizon or sky, aircraft are equipped with flight instruments. An understanding of the operation and idiosyncrasies of the flight instruments, combined with knowledge of physiology will help the flight surgeon understand some of the reasons pilots can become spatially disoriented. AFMAN 11-217, Vol 1, 22 Oct 2010, divides instruments into three categories: Control, Performance, and Navigation. Control instruments display attitude and power indications, and are calibrated to permit attitude and power adjustments in definite amounts (Attitude indicator and tachometers). The performance indicators include the heading indicators (RMI and J-2 compass), altimeters (radar and barometric), vertical velocity indicator and airspeed indicator. The barometric altimeter reads altitude above mean sea level (assuming the proper barometric pressure is dialed in), not height above the ground. When sitting at a ground check point, and the current altimeter setting is dialed in, the instrument should read close to the field elevation. The Radar altimeter reads height above the ground and is essential for low level operations.

The “Control and Performance Concept” of attitude instrument flying is essential because if you fly by reference to the control instruments while cross checking the performance instruments, you reduce the likelihood of spatial disorientation. The attitude indicator is the primary reference instrument for all pilots.

### **Mission**

While missions always have a unique nature to them, there are many similarities and predictable items with which the flight surgeon should be familiar. All missions have a departure and arrival phase and all phases of flight have critical physiologic problems associated with them. Whether flying a high G aircraft or a helicopter, rapid aircraft decent may cause acute barotitis media.

## **Return to Base (RTB)**

This is usually dictated by either completion of mission requirements or reaching “joker” fuel (the quantity of fuel to complete the mission with designated reserve fuel).

**IP to Initial** - The flight will precede VFR to one of the Initial points (IP).

**Visual Straight In** - This type of landing is just as it sounds. The aircraft visually identifies the field, lines up on the runway and flies straight in for a landing. This type may be used for formation landings.

**Instrument Approaches** - These are used in poor weather. There are various approaches to the most military airfields. These approaches have strict rules for airspeed, and altitude. They usually allow the pilot to descend to either a Minimum Decent Altitude (MDA) or Decision Height (DH) to try to visually acquire the runway. If the pilot reaches the DH or missed approach fix and has not located the runway he must go “missed approach”. This missed approach usually means retrying the approach, or if fuel is low, diverting to another field. The instrument approaches are published on approach plates found in the cockpit of all aircraft.

**PAR** (Precision Approach Radar) - This is a type of approach where a controller closely controls the aircraft on final approach. The controller will tell the pilot to turn left or right and steepen or shallow-out his glide path. This approach is also used in poor weather. The controller will tell the pilot to go missed approach if he does not visually acquire the runway in time.

Any of these approaches may end in a landing (called “full stop”) or a “low approach”. A low approach is an approach that stops just short of landing. Usually 20-30 feet above the runway the pilot will retract the gear and apply full power to go around for another approach.

## **Debrief**

After landing post flight inspection and securing the aircraft, the aircraft commander will go through maintenance debrief to report any problems they had with the jet or its systems. Make sure your name (flight surgeon) gets on the Form 781 for the flight. Log primary time to get credit for hours flown towards pay. Flight gear is then removed and the debrief starts soon after this. In the flight debrief, specific areas of the flight are discussed - what went right, and what went wrong. This is an excellent time to ask any questions about specifics of the mission. The flight debrief can last anywhere from several minutes to several hours.

## **Flight Medicine**

**Types of Personnel** - Flight Surgeons and medical technicians are either assigned to the Medical Group (MDG) or the Operations Group (OG). Squadron Medical Elements (SME / SOFME) with the enlisted medical technicians reporting to the squadron flight surgeon, and the flight surgeon reporting to the respective squadron commander. Performance reports, leave administration, TDY, etc. are handled by the SME's respective squadrons. Flight Medicine

personnel who are not assigned to an SME follow the normal MDG chain of command for administrative activities. The Aerospace Medicine Squadron Commander (AMDS/CC) coordinates closely with the Fighter Squadron Commanders so that performance reports and other administrative actions are appropriate. The NCOIC of Flight Medicine also coordinates closely with both the respective fighter squadron and the squadron flight surgeon on the same issues for the medical technicians.

## **Key Processes for Flight Surgeons**

### **Flying Duties and Responsibilities**

Flight surgeons are expected to actively fly with their assigned or attached squadron. Flight surgeons are responsible for scheduling their own flying time. This is done by contacting the scheduler at the appropriate squadron. Flight Surgeons need to be competent in, and knowledgeable about, egress, ejection, fire suppression and survival techniques. HALON decomposition products, characterized by a sharp acrid odor, are hazardous. Use of 100% oxygen, if available, should be used to provide respiratory protection. Flight surgeons have participated in combat flying in all the wars of the US since WW II.

Flight surgeons must be intimately familiar with medical concerns associated with aeromedical evacuation. This includes issues such as:

- ☐ Chest tubes: Heimlich valve.
- ☐ Oxygen delivery in-flight and blood oxygen carrying capacity associated with illness
- ☐ Post abdominal surgery: post op stability, bowel sounds, flatus, and possible NG tube.
- ☐ Casts: bivalve making longitudinal cuts along the medial and lateral sides of the cast due to swelling risk, no altitude restriction required.
- ☐ Infectious disease transport: mask and PPE.
- ☐ Cerebral edema: intracranial pressure monitor-bolt, possibly litter head forward in aircraft.
- ☐ Retinal detachments: Urgent-no restriction unless ophthalmologist recommended.
- ☐ Diabetes: glucometer, irregular meal times (mult. time zone), sliding scale, possible IV.
- ☐ Alcoholism: must be 72 hours post last drink.
- ☐ Wired jaws: quick release or wire cutters available with the patient.
- ☐ Urinary incontinence: catheter preflight.
- ☐ Pregnancy: stable not in labor, not term.

### **Flight Surgeon "Shop Visits"**

Flight Surgeons have a major responsibility in Wing Safety and disease prevention. When on a deployment, the deployed flight surgeon and the technicians are "The Aerospace Enterprise". Routine duties for flight surgeons include industrial hygiene shop visits, food sanitation, Aircrew Flight Equipment (life support), and tower inspections. Flight Surgeons do inspections routinely to keep preventive standards maximized and to learn techniques, and build competence for deployments.

Flying with the squadron is a type of “shop visit”. When the flight surgeon flies, he should be always looking for ways to improve performance and enhance safety for the squadron. Flying duties for a flight surgeon constitute a continual occupational evaluation of the flyer's work place, the cockpit.