November 19, 2008

Office of the Chief Health and Medical Officer

TO: Officials-in-Charge of Headquarters Offices
    Directors, NASA Centers

FROM: Chief Health and Medical Officer

SUBJECT: NASA Interim Directive (NID): Aviation Medical Certification of NASA Aircraft Pilot and Aircrew Members

The purpose of this NID is to issue an interim policy related to the aviation medical certification of NASA aircraft pilot and aircrew members to ensure that current medical certification practices are being implemented consistently across the Agency and to clarify existing NASA policy for aviation medical certification. This interim policy complements the existing medical certification policies contained in NPR 7900.3B Aircraft Operations Management, and defines an interim Agency aviation medical certification process, interim aviation medical standards, and interim medical evaluation requirements. All policies contained in NPR 7900.3B remain in effect. This NID will be in effect until a NASA Procedural Requirement (NPR) and updated aviation medical certification standards and examination requirements can be issued under the auspices of the Chief Health and Medical Officer. This NID applies to NASA Headquarters and NASA Centers, including Component Facilities and shall be enforced for 1 year from the effective date of this memorandum, unless superseded by a NPR and aviation medical certification standards and examination requirements within that year.

1.0 Authority

NPD 1000.3, The NASA Organization

NPR 1800.1, Occupational Health Program Procedures

NPR 7900.3B, NASA Aircraft Operations Management

2.0 NASA Flight Medical Certification

NPR 7900.3B states that “Pilots shall hold an Federal Aviation Administration (FAA) First Class medical certificate, military pilot flight physical, or NASA flight medical certification renewed annually or more frequently if specified by the Center Director or a
competent medical authority.” This NID provides additional detail on the criteria for NASA pilot flight (aviation) and NASA aircrew (flight engineers, flight surgeons, etc.) medical certification. This NID is applicable to all civil servant and contractor pilots and aircrew who operate aircraft (including helicopters, and pilots and observers of unmanned aerial systems and vehicles) for NASA.

NASA adopts the medical standards policy and guidelines of the Office of Aerospace Medicine of the FAA as the initial basis of determining an individual’s medical qualification for flight duty in NASA aircraft. These official policies and guidelines are defined in Part 67 of Subchapter D of Title 14 of the Code of Federal Regulations, the official Guide for Aviation Medical Examiners, and other official FAA publications. Appendix A provides the specific examination requirements and Appendix B provides the examination standards that must be met by NASA pilots for NASA aviation medical certification.

Additionally, a NASA flight surgeon/aviation medical examiner, if in their opinion the operational environment at their Center requires it, may impose additional medical certification requirements within their Center-wide procedures with the concurrence of the Center Director, the Center Chief of Flight Operations, and the NASA Chief Health and Medical Officer.

Even if NASA flight medical certification is granted, a number of restrictions on flight status and flight capability may be imposed by the Center Chief of Flight Operations as a result of the medical certification process and any subsequent waiver action. Appendix C provides the potential restrictions that may be imposed.

Once an employee is certified for flight, any significant changes of the individual’s medical status (e.g., due to serious injury, illness and/or hospitalization) may result in a temporary suspension of medical flight certification (medical grounding action or Duties Not to Include Flying) until the individual’s health can be evaluated. An employee will report any change in medical status to the appropriate local aviation medical authority immediately.

### 3.0 Qualifications for providing flight certification

Medical examination for certification under the NASA Aviation Medical Certification System of a NASA pilot or aircrew member can only be accomplished by a NASA Flight Surgeon/Aviation Medical Examiner. A NASA Flight Surgeon/Aviation Medical Examiner must meet the following criteria:

1) Is a physician, either D.O. or M.D.;
2) Holds a current and unrestricted medical license;
3) Has successfully completed NASA Flight Surgeon functional training (details to be determined); and
4) Has successfully completed the FAA Aviation Medical examiner basic course, or any Department of Defense flight surgeon training course.

Physicians at NASA Centers with appropriate qualifications will be designated as NASA Aviation Medical Examiners by the Chief Health and Medical Officer by letter upon application and verification of qualifications. NASA Aviation Medical Examiners shall certify that pilots and aircrew meet NASA aviation medical standards (see Appendix A and B) by signing a NASA Medical Certification for Flying Duty form (to be created).

4.0 Waivers

Waiver of the requirements for flight certification in this NID will be granted according to the policies in NPR 7900.3B which state:

“Flight crews shall report Special Issuances (FAA Waivers) and FAA Statements of Demonstrated Ability (SODA) to the Chief of Flight Operations for review by a NASA Aero-medical Physician.” (note – in this document referred to as Aviation Medical Examiner)

“Considerations for NASA-specific aero-medical waivers will be processed through the NASA Aerospace Medicine Board and the NASA Medical Policy Board as appropriate.”

An expiration date will be placed on waivers for conditions that may progress or require periodic reevaluation outside of the scope of periodic medical examinations. This will insure periodic review of waivers by the appropriate waiver authority. Waivers are valid for the specified condition only. Any exacerbations of the condition, or other changes in the individual’s medical status automatically invalidate the waiver and a new one must be requested. In some circumstances waivers may be conditional and individuals may receive waivers valid only for specific aircraft, missions, or flight crew configurations.

4.1 Waiver authority

The waiver authority for this guidance is the NASA Chief Health and Medical Officer who delegates that authority to the Chair, Aerospace Medicine Board (AMB) at Johnson Space Center.

4.2 Waiver Procedures

Any pilot who does not meet NASA aviation medical standards should be deferred to the AMB Chair for waiver consideration. The AMB Chair, in consultation with the AMB, then determines if a waiver is warranted and appropriate. When a waiver is granted, a notation of waiver will be made by the attending NASA Aviation Medical Examiner in the pilot’s medical record and on the NASA Medical Certification for Flying Duty form. The expiration date of the waiver will likewise be noted.
4.3 Waiver Considerations

To be considered acceptable for flying duty, a medical condition, medication, or treatment must:

1. Not pose a risk of sudden incapacitation
2. Not interfere with the individual’s ability to perform their flight duties.
3. Not impact the safe operation of the aircraft.
4. Not interfere with the usage or effectiveness of the personal safety equipment in the aircraft, including but not limited to oxygen supply equipment, pressure suits, and ejection seats.
5. Pose minimal potential for subtle performance decrement, particularly with regard to the higher senses, including but not limited to vision, level of alertness, or cognition.
6. Be resolved or be stable and be expected to remain so under the stresses of the aviation environment for the maximum duration of the waiver.
7. Not be exacerbated by nominal flight activities, including aircraft ingress/egress.
8. Not place the individual at significantly increased risk of injury during in-flight or ground emergency situations. This includes risk of injury during emergency egress procedures, including ejection.
9. Have first symptoms or signs that are easily detectable and not pose a risk to the individual or the safety of others, if the possibility of progression or recurrence exists.

5.0 Appeal of Medical Disqualification or Waiver Denial

Individuals who are medically disqualified from flying duty and denied waiver by the Chair, AMB have the right to appeal their case to the NASA Chief Health and Medical Officer. The decision of the Chair, AMB, is final unless and until it is overturned by the Chief Health and Medical Officer.

Appeal of waiver denials will be made in writing to the NASA Chief Health and Medical Officer within 30 calendar days. The individual requesting the waiver will likewise be informed of the progress of his/her waiver considerations, as well as any additional requirements that might be needed.

6.0 Roles and Responsibilities

6.1 NASA Chief Health and Medical Officer shall:

1) Establish and maintain aviation medical standards for NASA medical
certification of NASA pilots and aircrew.

2) Waiver authority for NASA aviation medical certification decisions.

3) Adjudicating appeals of flight disqualification or waver denial decisions made as part of the NASA aviation medical certification process.

6.2 Aerospace Medicine Board shall:

1) Through delegation from the Chief Health and Medical Officer, consider and grant waivers or denials for NASA aviation medical certification.

2) Participate in the development of aviation medical standards for NASA medical certification of NASA pilots and aircrew.

6.3 Individuals on active flight duty shall:

1) Supply complete and accurate information regarding any and all current and past medical conditions, medications, and treatments to the examining clinician. No individual may perform aircrew duties if the individual knows, or has reason to suspect, of any medical condition that would make him or her unable to meet established medical requirements. Also, no aircrew duties may be performed if a person is taking medication or receiving other treatment for a medical condition that results in the person being unable to meet the applicable requirements for the medical certification.

2) Immediately report any changes in their medical condition to the attending NASA Aviation Medical Examiner.

6.4. NASA Flight Surgeon/Aviation Medical Examiner shall:

1) Perform a thorough medical evaluation that meets the NASA medical examination requirements (Appendix A and B).

2) Review any and all current and past medical conditions, medications, and treatments, and determine whether they are disqualifying or potentially disqualifying, according to NASA aviation medical standards.

3) Record all identified medical conditions and treatments in each individual flyer’s medical record completely, accurately, and in a timely manner.

4) Report any change in an individual’s flight status to the Center Chief Medical Officer.

   a) In the case of Centers without a Chief Medical Officer, the NASA Flight Surgeon/Aviation Medical Examiner will report to the Chief Medical Officer at the geographically closest Center.

5) Defer any NASA pilot if they do not meet NASA aviation medicine standards to the NASA Aerospace Medicine Board Chair for waiver consideration.
6.5 Center Chief Medical Officers shall:

1) Serve as the reporting authority for all aviation medical issues at their Center and for Centers that are geographical close and do not have a Chief Medical Officer, and

2) Maintain records for all medically qualified and disqualified flight personnel at their Center and other Centers for which they are responsible.

6.6. Center Flight Crew Operations authority shall:

1) Communicate to the Center Chief Medical Officer, or NASA Aviation Medical Examiner at that Center, the names of the individuals requiring medical certification for flying duty.

2) Ensure that individuals with invalid or expired medical certification for flying duty are removed from the active flying duty roster.

3) Remove individuals who are medically disqualified from the active flying duty roster.

7.0 References

14 CFR §61.3, Requirement For Certificates, Ratings, And Authorizations.

14 CFR §61.53, Prohibition on Operations During Medical Deficiency.

14 CFR Part 67, Medical Standards and Certification.

Questions regarding this NID should be forwarded to Dr. David Liskowsky at (202) 358-2390.

[Signature]

Richard S. Williams, MD, FACS
APPENDIX A
NASA Flight Medical Certification
Examination Requirements for NASA Pilots and Aircrew

A. NASA pilots and aircrew members must annually fulfill the examination requirements of an FAA Class I (One) medical certificate (regardless of whether or not they choose to hold an actual FAA medical certificate) and any applicable NASA supplemental examination standards (Appendix B). For Mission Management Aircraft (MMA), the pilot must hold an FAA Class 1 medical certificate.

B. Medical certification for NASA pilots age 55 and over are presumed valid for six (6) months only unless, in the judgment of the flight surgeon, the certification should be valid for 12 months. Medical certificates for other NASA aircrew members will be valid for 12 months.

C. In addition to the above, the following additional tests are required:

• Annual Electrocardiogram.
• Annual Audiometry.
• Annual Blood Work, to include:
  1. Hematocrit (and/or Hemoglobin);
  2. Lipid Profile: Total Cholesterol, Triglycerides (TG's), High Density Lipoprotein (HDL), and Low Density Lipoprotein (LDL);
  3. Annual Fasting Blood Sugar; and
  4. C-Reactive protein (also known as "High sensitivity CRP" or "Cardo-CRP").
• Urinalysis (U/A) dipstick.
• Vision testing (near, distant, intermediate; each eye separately and together with and without correction).
• Color vision testing.
• Peripheral vision test.
• Physical examination by the NASA Flight Surgeon/Aviation Medical Examiner.
APPENDIX B

NASA Flight Medical Certification Supplemental
Examination Standards for NASA Pilots and Aircrew

A. Resting electrocardiogram – An individual shall NOT be medically qualified for flying duties if they manifest the following findings on a resting EKG:

1) Left Bundle Branch Block (LBBB) in an individual over 40 years of age;
2) QRS complex of more than 140 milliseconds, regardless of age;
3) Evidence of prior myocardial infarction, e.g., Q-waves; and
4) Left Ventricular Hypertrophy (LVH).

Note: Medical clearance will be considered only if an echocardiogram shows no evidence of asymmetric septal hypertrophy (ASH) or any other condition that would pose a safety or health risk in the high altitude or high performance flying environment.

B. Audiometry – There are two reasons for annual audiometry: 1) Certification and 2) Surveillance.

1) With regard to Certification, absolute levels of hearing loss demonstrated on the audiogram shall by themselves not be cause for disqualification from flying duties unless the levels of loss exceed those annotated in the FAA Guide for Aviation Medical Examiners. A Standard Threshold Shift (STS), whether temporary or permanent, shall not be cause, by itself, for disqualification from flying duties, provided there is no deficiency in the ability to communicate in flight. (Tests for adequacy of communication are described in the FAA Guide for Aviation Medical Examiners).

2) With regard to Surveillance, all personnel whose jobs require flying duties on NASA aircraft are to be considered occupationally exposed to hazardous noise. Therefore, they must be placed in the Hearing Conservation Program. Procedures for administering this program are found in NPG 1820.1 and in local Center-wide procedures. It should be noted that a Standard Threshold Shift (STS), whether temporary or permanent, or an OSHA-reportable hearing loss, shall not be cause, by itself, for disqualification from flying duties, provided there is no deficiency in the ability to communicate in flight. (Tests for adequacy of communication are described in the FAA Guide for Aviation Medical Examiners).

C. Hematocrit (and/or Hemoglobin)

1) An individual shall not be medically qualified for flying duties if they manifest a hemoglobin level (Hgb) < 10 g/dL, and/or
2) Hematocrit (Hct) < 30 mg/dL.
D. Risk Factors for Coronary Artery Disease

1) If an individual manifests five (5) or more of the below-listed risk factors, then he or she shall undergo further evaluation to determine the presence or absence of obstructive coronary artery disease. Such evaluation may consist of a graded exercise tolerance ("stress") test and if positive (e.g., > 2mm S-T segment depression), then the pilot is disqualified.

1. Male gender.

2. Age: Men > 45 or women > 55 years of age.

3. Family history of heart disease, heart attack or stroke: Father / brother(s) < age 55; mother / sister(s) < age 65; or first-degree relative with sudden unexplained cardiac death.

4. Tobacco use: Current cigarette smoker (>1/2 pack per day) or has quit smoking within the past 6 months.

5. Hypertension: Systolic blood pressure > 140 mm Hg or diastolic > 90 mm Hg confirmed by measurements on three separate occasions with the patient in the sitting position, arm at the approximate level of the heart.

6. Obesity: Body Mass Index of > 30 kg/m2 (or waist girth of greater than 100 cm).

7. Fasting blood glucose: > 125 mg/dL.

8. Hypercholesterolemia: LDL > 160 mg/dL.

9. Low HDL: HDL < 35 mg/dL. (Note: Elevated HDL serves as a positive counter-risk factor: HDL cholesterol score of >60 mg/dl within one year from date of examination will count as a positive counter-risk factor, i.e., subtract one of the above risk factors).

10. C-Reactive protein (CRP): > 3.0 mg/ml.

2) If coronary artery disease is present, a waiver to flight disqualification will be considered if the obstructive coronary artery disease is corrected, e.g., Coronary Artery Bypass Grafting (CABG), angioplasty, etc.

E. Pregnancy

Any female pilot or aircrew member of high performance aircraft or high altitude aircraft must report pregnancy to the NASA Flight Surgeon/Aviation Medical Examiner. Pilots and aircrew members of conventional aircraft (non-high-performance, or non-high-altitude) are not required to report pregnancy, unless or until it interferes with their flight
duties. If a female pilot or aircrew member is pregnant and will fly high performance aircraft or high altitude aircraft, she must be evaluated as soon as the pregnancy is known by the NASA Flight Surgeon/Aviation Medical Examiner to determine if restrictions or limitations are indicated.

F. High Performance Aircraft Restrictions

1) Individuals on beta-blocker medications (which are sometimes used in the treatment of hypertension) will NOT be eligible (without waiver) for solo or Instructor Pilot duties in high performance aircraft, even if they otherwise meet the medical requirements of an FAA Class I (One) medical certificate.

2) Individuals on flying status who have had surgery on the spine will NOT be eligible (without waiver) for flight in high performance aircraft, even if they otherwise meet the medical requirements of the appropriate FAA class medical certificate.

3) Individuals on flying status who have had a medical condition or who are taking medication that has a reasonable probability of affecting personal health, flying safety, or mission completion when flying high performance aircraft must undergo review and obtain written approval from the NASA Flight Surgeon/Aviation Medical Examiner before he or she is allowed to participate in high performance flight operations.

G. Any condition, treatment or medication that in the opinion of the cognizant NASA Flight Surgeon/Aviation Medical Examiner has a reasonable probability to present a significant risk to personal health, flying safety or mission completion shall be cause for medical disqualification from flying duties. (Note: In such instances the NASA Flight Surgeon/Aviation Medical Examiner must be prepared to explain to the affected individual, and the NASA Aerospace Medicine Board the nature of the condition, treatment or medication, and the specific reasons it may pose a risk to personal health, flying safety or mission completion).

H. Individuals on flying duty are required to report any changes in their medical condition to the cognizant NASA Flight Surgeon/Aviation Medical Examiner. Reportable medical conditions include, but are not limited to:

1) The initiation of any new medication (prescription or nonprescription),

2) Any visits to a physician’s office or an Emergency Room as a patient, for any reason,

3) Any admissions to the hospital (as a patient),
4) Any medical procedures requiring anesthesia or conscious sedation,

5) Any changes in vision, hearing, or other physical senses, and

6) Any injuries or illnesses that affect, or reasonably could affect, the individual’s ability to perform flying duties.
APPENDIX C
Potential Flight Restrictions Based On Medical Conditions And Waiver

A. High performance fighter, attack, reconnaissance, and trainer aircraft:

1) Pilot restricted from solo flights.
2) Pilot removed from instructor pilot status in these aircraft.
3) Pilot can continue to fly dual in tandem seat aircraft with dual controls under the following conditions:
   a) Pilot can fly in front seat with an instructor pilot in the rear seat;
   b) Pilot can fly in rear seat when the front seat is occupied by another fully qualified pilot; and
   c) Pilot can perform landings from the rear seat only if the front seat is occupied by an instructor pilot.
4) Pilot restricted from flights requiring full or partial pressure suits.
5) Director for Flight Operations determines which aircraft are classified in this category.

B. Heavy transport, utility, bomber, and business class aircraft (aircraft maximum gross weight greater than 12,500 pounds)

A pilot can fly in either seat if the other seat is occupied by a fully qualified pilot for that crew position (including a fully qualified copilot).

C. Light utility aircraft requiring only one pilot (aircraft maximum gross weight of 12,500 pounds or less):

1) No restrictions for solo operations, and
2) Restricted from carrying secondary and non-essential aircrew unless a fully qualified pilot occupies a seat in the aircraft with access to the flight controls. Refer to DOP-O-300 for definitions of secondary and non-essential aircrew.

D. Mission Management Aircraft (MMA)

A pilot can fly in either seat if the other seat is occupied by a fully qualified pilot for that crew position (including a fully qualified copilot). Any flight restriction or waiver to an MMA pilot’s FAA medical certificate must be granted by the FAA.