

NASA-STD-2805 Fall 2015 MINIMUM HARDWARE CONFIGURATIONS

November 18, 2015

NASA TECHNICAL STANDARD

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FOREWORD

This Standard is approved for use by NASA Headquarters and all NASA Centers and is intended to provide a common framework for consistent practices across NASA programs.

The material covered in this Standard is governed and approved by the NASA Information Technology Management Board. Its purpose is to define minimum hardware configurations necessary to support interoperability both between NASA end user computers and within the NASA operating environment. The Standard establishes minimum “to keep” and minimum “to buy” hardware configurations. Adherence to this Standard ensures compliance with federal requirements for end user computing devices.

Requests for information, corrections, or additions to this Standard should be directed to the John H. Glenn Research Center at Lewis Field (GRC), Emerging Technology and Desktop Standards Group, MS 142-4, Cleveland, OH, 44135 or to desktop-standards@lists.nasa.gov.

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1 SCOPE

1.1 Purpose

NASA-STD-2805 defines the minimum Agency hardware interoperability technical specifications. The specifications apply to all end user computing devices participating in the NASA environment.

1.2 Applicability

Center CIOs will ensure that all NASA employees at their respective centers have access to an interoperable system that is equipped with a minimum hardware configuration that meets the standards listed in Section 3 below. The Hardware Reference Configuration (HRC) establishes required functionality and required products necessary to meet that functionality. End user hardware specifications not meeting the defined minimum configuration may be used in areas where interoperability is not required; however,

NASA-STD-2805 Mission systems such as end user workstations must meet the criteria specified in section 3.3 of this document to ensure mission, program, and Agency interoperability.

1.3 Waivers

This technical Standard is governed by Enterprise Architecture Function as defined in Section 1.2.1.3 of NPR 2800.1B Managing Information Technology. Adherence to this Standard ensures compliance with the future state architecture as described in NPR 2830.1 NASA Enterprise Architecture Procedures.

The Emerging Technology and Desktop Standards group, in cooperation with the End User Services Service Executive and the Chief Enterprise Architect, will evaluate and process waivers to this Standard as appropriate. Waiver requests will include:

1. the reason the waiver is required
2. justification for the waiver
3. a proposed date by which compliance with the standard will be met

Waivers will be granted by the NASA CIO, or at his/her discretion, responsibility will be delegated to the Center or Mission Directorate CIO.

1.4 Sunsetting Technology and Streamlining of NASA-STD-2805 HRCs

1.4.1 Removable Storage

NASA-STD-2805 no longer specifies encrypted removable storage as a requirement for individual HRCs. End users with continuing removable storage requirements must use FIPS 140-2 validated media. FIPS 140-2 validated storage devices are available for procurement via the ACES Product Catalog at <http://aces.ndc.nasa.gov/order.html>. For HRC specification stability purposes, removable storage requirements are maintained in the Sunsetting and Legacy Technology section of NASA-STD-2805.

1.4.2 Optical Disk Drives

Cloud based software delivery and the increasing availability of shared storage is quickly minimizing the need for optical disk drives as a discrete NASA-STD-2805 HRC specification. This trend is evident in the diminishing availability of optical disk drives across OEM product portfolios. As a result, optical disk drives are being moved to the Sunsetting and Legacy Technology section of NASA-STD-2805, and are no longer required for NASA-STD-2805 HRCs unless discretely specified within a NASA-STD-2805 HRC. Only the PC Desktop and Engineering HRCs specify an optical disk requirement in NASA-STD-2805 2015.

1.4.3 Deprecated NASA-STD-2805 HRCs

In response to end user feedback and marketplace evolution, several HRCs have been deprecated from NASA-STD-2805. The HRCs that have been removed from NASA-STD-2805 follow:

- Windows 8 PC Desktop
- Windows 8 PC Laptop
- Windows 8 Slate
- PC All-In-One
- High End PC Desktop
- High End PC Laptop

1.5 Increased Mobility Focus

To better reflect marketplace trends, several mobility-focused adjustments have been made to the NASA-STD-2805 laptop HRCs. The [PC Laptop HRC](#) no longer specifies a discrete optical drive requirement and has a maximum weight of 4.5 lb. In an effort to reduce size, weight, and increase portability, the [PC Lightweight Laptop HRC](#) weight has been reduced to a maximum of 3.5 lb. The [PC Ultra Lightweight HRC](#) is closely aligned with industry's UltraBook specification. The UltraBook specification states "UltraBook devices are 20mm or less in thickness for systems with displays smaller than 14 inches and 23mm or less for systems with displays 14 inches or larger; many systems are much thinner." To satisfy the requirements of highly mobile end users, a [Detachable 2-in-1 \(tablet\) HRC](#) has been added to the Standard.

2 ACRONYMS AND DEFINITIONS

2.1 Acronyms

CAD	Computer-Aided Design
CRT	Cathode Ray Tube
EPEAT	Electronic Product Environmental Assessment Tool
GB	Gigabyte
HDD	Hard Disk Drive
HRC	Hardware Reference Configuration
LCD	Liquid Crystal Display
LED	Light Emitting Diode
RPM	Revolutions Per Minute
SSD	Solid State Drive
TB	Terabyte

2.2 Definitions

Term	Definition
End User Computing System	The term <i>End User Computing System</i> is used generically to refer to traditional desktop systems, as well as laptop computers, notebooks, engineering workstations, mobile form factors, and similar platforms that are utilized to provide basic interoperability.
Mobile Engineering Workstation	<i>Mobile Engineering Workstation</i> is used to describe high performance systems targeting the scientific, engineering, and CAD community in a mobile form factor. Mobile Engineering Workstations are configured with high performance components and a wider array of ports than typical mainstream offerings. The resulting systems are portable yet typically heavier than their non-engineering peers. Mobile Engineering workstations align with the Mission category of systems and NASA-STD-2805 specifies three such configurations: The Apple Mobile Engineering Workstation, 15" Mobile Engineering Workstation and the 17" Mobile Engineering workstation.
Slate Computer	A slate is a touch oriented computing device whose design omits a permanently attached physical keyboard to achieve a much lighter weight than other form factors. NASA-STD-

	2805 includes three slate HRCs: the Apple iPad Air 2, the Apple iPad Mini 4, and the Detachable 2-In-1 systems.
Tablet Computer	A tablet computer is defined as a computing device with a <i>physically attached keyboard</i> and a touch screen. Tablets are noteworthy for their light weight, attached keyboard, and generally smaller display sizes. Hardware innovations such as slates and ultra lightweight laptops with touch screens have encroached on, and minimized the prominence of PC Tablets with attached keyboards. These marketing pressures have relegated PC Tablets (as defined here) to the category of sunseting technology.
Minimum Workstation to Support Basic Interoperability	Workstations that support basic interoperability are defined by being networked, and by having users who exchange information electronically, including those users that perform any or all of the activities encompassed in the minimum office automation software suite defined below.
Minimum "To Keep" Workstation Hardware Configuration	This category defines the minimum interoperable workstation hardware configuration that may be retained by a NASA organization.
Minimum "To Buy" Workstation Hardware Configuration	This category defines the minimum interoperable workstation hardware configuration that may be procured by a NASA organization. The CIO at each Center is empowered and accountable for determining the performance/cost assessment for configurations that exceed the minimum hardware configuration and its associated cost. The Center CIO will also ensure that obsolete workstations are excessed on a one-for-one basis as new workstations are introduced.
Minimum Interoperability Software Suite	The Minimum Interoperability Software Suite is defined in NASA-STD-2804, "Minimum Interoperability Software Suite."
General Purpose Office Automation Systems	General Purpose Office Automation Systems provide the general office automation functions and highest degree of enterprise interoperability to meet the broadest organizational needs. Example HRCs include the PC Desktop, PC Laptops including lightweight and ultra lightweights, Apple OS X Desktop and Apple OS X Laptops including lightweight and ultra lightweights.
Mobile Computing Systems	Mobile Computing Systems may sacrifice appreciable functionality for specific form factor benefits and in some instances enterprise interoperability. Example HRCs include smartphones, slate devices such as the iPad, and tablets.
Mission Systems	Mission Systems are computing systems defined by NASA Program specifications to meet broad mission needs and include engineering HRCs, mobile engineering, and CAD HRCs.
Legacy and Sunseting Technology	This category represents formerly mainstream technology that persists in the Standards for specification stability reasons, until no longer required within the NASA environment. Current examples include optical drives and USB thumb drives.

3 GENERAL REQUIREMENTS

3.1 Architectural Compliance Requirements

NASA maintains a base-lined and approved Information Technology Architecture. The architecture is predicated on:

- The selection of Standards for a broad and cost-effective infrastructure using commercial off-the-shelf and well-supported open source products to the greatest extent practical â" Interoperability both within and external to NASA
- Flexibility for future growth
- Consistency with generally accepted consensus standards as much as feasible
- Among these objectives, ensuring interoperability is one of NASA's most critical issues related to information technology

At times, it is in NASA’s best interest to specify commercial products as standards for an interoperable implementation of a particular set of related and integrated functions. The products themselves often include additional functionality or proprietary extensions not specified by this standard. While these products can be used to create higher-level interoperability solutions, these solutions may not be recognized within the context of the NASA interoperability environment and may be deprecated without warning by future revisions to this standard. Users of this standard are advised to apply appropriate caution when implementing proprietary or non-standard extensions, features, and functions that go beyond the explicitly stated standard functionality.

3.2 Computing Platforms

This standard recognizes that NASA is a diverse agency with independent computing requirements. NASA will continue to support three desktop computing platforms: Windows, OS X, and Linux/UNIX.

3.3 Performance-Based Interoperability

The following tables establish the minimum desktop system hardware configurations that will support the Agency-wide interoperability software suite as defined in NASA-STD-2804.

3.3.1 Minimum Hardware Requirements for PC and Apple Systems

Minimum “To Keep” Requirements for PC Systems Running Windows 7/8		
System Component	Component Characteristics	Comments and/or Component Specification(s)
Processor	32-bit or 64-bit x86 Minimum Base Processor Frequency 1.0 GHz	Windows 7/8 Requirement
Memory (RAM)	1 GB	Windows 7/8 Requirement
Hard Disk Capacity	16 GB	Windows 7/8 Requirement
Graphics Technology	32 Bit Color Support	Windows 7/8 Requirement
Display Type	LCD	CRT displays shall be retired as of June 2013
Display Resolution	1024 x 768 Pixels	MS Office 2007 Requirement
Optical Drive	4x or greater	
Sound	Analog Stereo Output	
Speaker(s)		Internal
Interfaces	USB, PCI, Parallel or Serial	
Network Interface	10 Base-T Ethernet	
Smart Card Reader	Required FIPS-201 Approved Transparent Reader	See 3.3.4 below
Energy Savings	EPEAT Registered	See 3.3.5 below
Minimum “To Keep” Requirements for Systems Running OS X 10.10 and 10.11		
System Component	Component Characteristics	Comments and/or Component Specification(s)
Supported Models:	iMac (Mid 2007 or newer)	These models are required for OS X 10.10 Yosemite and above
	MacBook (Late 2008 Aluminum, or Early 2009 or newer)	

	MacBook Pro (Mid/Late 2007 or newer)	
	MacBook Air (Late 2008 or newer)	
	Mac mini (Early 2009 or newer)	
	Mac Pro (Early 2008 or newer)	
	Xserve (Early 2009)	
Memory (RAM)	2 GB	Required for Yosemite and above
Smart Card Reader	Required FIPS-201 Approved Transparent Reader	See 3.3.4 below
Energy Savings	EPEAT Registered	See 3.3.5 below

3.3.2 NASA-STD-2805 HRC Development Process

The development and formulation of the NASA-STD-2805 Hardware Reference Configuration takes into account many factors including system lifecycle expectations, the evolution of NASA-STD-2804, future OCIO portfolio offerings, and emerging Federal and NASA regulations. Additional information concerning the development process is available in the Concept of Operations located at:

<http://etads.nasa.gov/downloads/NASA-STD-2805ClientDeviceHardwareConOps.pdf>

3.3.2.1 PC Desktop Systems

PC Desktop Systems				
System Component	Standard Desktop	Single Socket Engineering Workstation	Dual Socket Engineering Workstation	CAD Workstation
Processor	Intel Skylake Core i5-6500 equivalent or higher performance	Intel Haswell Xeon E5 E5-1650V3 equivalent or higher performance	2x Intel Haswell Xeon E5 E5-2630 V3 equivalent or higher performance	Intel Haswell Xeon E5 E5-2643v3 equivalent or higher performance
Graphics Technology	≥ Intel HD graphics or higher	≥ NVIDIA Quadro K2200 Graphics Memory ≥ 4GB GDDR5 128-bit or higher ≥ 1 Dual Link DVI ≥ 1 Display Port ISV Certified	≥ NVIDIA Quadro K5000 Graphics Memory ≥ 4GB GDDR5 256-bit ≥ 1 Dual Link DVI ≥ 1 Display Port ISV Certified	≥ NVIDIA Quadro K5000 Graphics Memory ≥ 4GB GDDR5 256-bit ≥ 1 Dual Link DVI ≥ 1 Display Port ISV Certified
Display	≥ 24" Diagonal LED or equivalent, with a minimum vertical viewable area as afforded by the standard 24" monitor with an aspect ratio of 16:9	≥ 24" Diagonal LED or equivalent, with a minimum vertical viewable area as afforded by the standard 24" monitor with an aspect ratio of 16:9	≥ 24" Diagonal LED or equivalent, with a minimum vertical viewable area as afforded by the standard 24" monitor with an aspect ratio of 16:9	≥ 24" Diagonal LED or equivalent, with a minimum vertical viewable area as afforded by the standard 24" monitor with an aspect ratio of 16:9
Display Resolution	≥ 1920 x 1080 resolution			
RAM	≥ 8GB 1600 MHz	≥ 32GB DDR4 2133 MHz	≥ 32GB, DDR4 2133 MHz	≥ 32GB ECC 1600 MHz
Hard Disk Drive Type(s)	SATA Interface	1 - Solid State Drive 1 - 7200 RPM Drive	1 - Solid State Drive 1 - 7200 RPM Drive	1 - Solid State Drive 1 - 7200 RPM Drive

RAM	≥ 8GB 1600MHz	≥ 8GB 1600MHz	≥ 8GB 1600MHz	≥ 8GB 1600MHz	≥ 16GB 1600MHz or higher	≥ 16GB 1600MHz or higher
Hard Disk Drive Type	≥ 7200 RPM	Solid State Drive	Solid State Drive	Solid State Drive	1 - Solid State Drive & 1 - 7200 RPM or higher	1 - Solid State Drive & 1 - 7200 RPM or higher
Hard Disk Drive Size	≥ 500 GB	≥ 256GB	≥ 256GB	≥ 256GB	1 - 500GB RPM & 1 - 256GB SSD	1 - 500GB RPM & 1 - 256GB SSD
Sound	Analog Stereo Output	Analog Stereo Output	Analog Stereo Output	Analog Stereo Output	Analog Stereo Output	Analog Stereo Output
Speakers	Internal	Internal	Internal	Internal	Internal	Internal
Microphone	Internal	Internal	Internal	Internal	Internal	Internal
Peripherals Interface	2 or more USB 3.0	2 or more USB 3.0	2 or more USB 3.0	2 or more USB 3.0	2 or more USB 3.0	2 or more USB 3.0
Network Interface	Wired LAN connectivity	Wired LAN connectivity	Wired LAN connectivity	Wired LAN connectivity	Wired LAN connectivity	Wired LAN connectivity
Wireless Network Interface	≥ 802.11n	≥ 802.11n	≥ 802.11n	≥ 802.11n	≥ 802.11n	≥ 802.11n
Bluetooth	Bluetooth Low Energy 4.0	Bluetooth Low Energy 4.0	Bluetooth Low Energy 4.0	Bluetooth Low Energy 4.0	Bluetooth Low Energy 4.0	Bluetooth Low Energy 4.0
Energy Savings	EPEAT Gold registered	EPEAT Gold registered	EPEAT Gold registered	EPEAT Gold registered	EPEAT Gold registered	EPEAT Gold registered
Camera	Yes	Yes	Yes	Yes	Yes	Yes
Optical Drive	None	None	None	None	None	None
Weight	4.5 lb. maximum	3 lb. maximum	3.5 lb. maximum	2.3 lb. or less (without keyboard), 3.71 lb. or less (with attached keyboard)	6.5 lb. maximum	7.75 lb. maximum
Platform	Trusted Platform Module 1.2	Trusted Platform Module 1.2	Trusted Platform Module 1.2	TPM Chip for Enterprise Security	Trusted Platform Module 1.2	Trusted Platform Module 1.2
Smart Card Reader	FIPS-201 Approved Transparent Reader	FIPS-201 Approved Transparent Reader (USB reader supplied if not integrated)	FIPS-201 Approved Transparent Reader	FIPS-201 Approved Transparent Reader (USB reader supplied if not integrated)	FIPS-201 Approved Transparent Reader (USB reader supplied if not integrated)	FIPS-201 Approved Transparent Reader
Other Components				Additional Keyboard - Physical, Attachable / Detachable		

3.3.2.3 Apple Desktop Systems

Apple Desktop		
System Component	Apple Desktop	Apple Engineering Workstation
Model	27" Apple iMac	Apple Mac Pro
Processor	3.2GHz quad-core Intel Core i5 processor (Turbo Boost up to 3.6GHz)	6-Core Intel Xeon E5 with 12MB L3 cache and Turbo Boost up to 3.9GHz
Graphics Technology	AMD Radeon R9 M380 with 2GB video memory	Dual AMD FirePro D500 graphics processors with 3GB of GDDR5 VRAM each
Display	27" Retina 5K	≥ 24" Diagonal LED or equivalent, with a minimum vertical viewable area as afforded by the standard 24" monitor with an aspect ratio of 16:9
Display Resolution	5120 x 2880	≥ 1920x1080
RAM	≥ 8GB 1600MHz DDR3	≥ 32GB DDR3 ECC memory
Hard Disk Drive Type	Solid State Drive, PCIe-based flash storage	Solid State Drive, PCIe-based flash storage
Hard Disk Drive Size	≥ 256GB	1TB
Mouse	Apple Magic Mouse	Apple Magic Mouse
Keyboard	Apple Wireless Keyboard	Apple USB Keyboard with Numeric Keypad
Sound	Headphone/optical digital audio output (minijack)	Combined optical digital audio output/analog line out minijack
Speakers	Internal Stereo	Internal
Microphone	Internal Dual microphones	None
Peripherals Interface	Four USB 3 ports	Four USB 3 ports 6 Thunderbolt 2 HDMI 1.4 UltraHD
Network Interface	Gigabit Ethernet	Dual Gigabit Ethernet ports
Wireless Network Interface	802.11ac Wi-Fi	802.11ac Wi-Fi
Bluetooth	Bluetooth 4.0 wireless technology	Bluetooth 4.0 wireless technology
Energy Savings	Rated EPEAT Gold	Rated EPEAT Gold
Camera	Internal FaceTime HD camera	None
Optical Drive	None	None
Smart Card Reader	FIPS-201 Approved USB Smart Card Reader	FIPS-201 Approved USB Smart Card Reader

3.3.2.4 Apple Laptop Systems

Apple Laptop Systems				
System Component	Ultra Lightweight Laptop	Lightweight Laptop	Laptop	Mobile Engineering Workstation
Model	Apple MacBook Air 13"	Apple MBP 13 Retina	Apple MBP 15 Retina	Apple MBP 15 Retina
Processor	2.2GHz Dual-Core Intel Core i7, Turbo Boost up to 3.2GHz	≥ 2.7GHz dual-core Intel Core i5 processor (Turbo Boost up to 3.1GHz)	≥ 2.5GHz quad-core Intel Core i7 processor (Turbo Boost up to 3.7GHz)	2.8GHz Quad-core Intel Core i7, Turbo Boost up to 4.0GHz
Graphics Technology	Intel HD Graphics 6000	Intel Iris Graphics 6100	Intel Iris Pro Graphics	Intel Iris Pro Graphics + AMD Radeon R9 M370X
Display	13.3-inch (diagonal) LED-backlit glossy widescreen display with support for millions of colors	Retina display: 13.3-inch (diagonal) LED-backlit display	Retina display: 15.4-inch (diagonal) LED-backlit display	Retina display: 15.4-inch (diagonal) LED-backlit display
Display Resolution	1440 x 900	2560 x 1600 resolution at 227 pixels per inch with support for millions of colors	2880 x 1800 resolution at 220 pixels per inch with support for millions of colors	2880 x 1800 resolution at 220 pixels per inch with support for millions of colors
RAM	8GB 1600MHz LPDDR3 SDRAM	≥ 8GB 1866MHz LPDDR3 onboard memory	16GB 1600MHz DDR3L onboard memory	16GB 1600MHz DDR3L SDRAM
Hard Disk Drive Type	Solid State Drive, PCIe-based Flash Storage	Solid State Drive, PCIe-based flash storage	Solid State Drive, PCIe-based flash storage	Solid State Drive, PCIe-based Flash Storage
Hard Disk Drive Size	≥ 256GB	256GB	≥ 512GB	≥ 512GB
Sound	Headphone port	Headphone port	Headphone port	Headphone port
Speakers	Internal Stereo Speakers	Internal Stereo Speakers	Internal Stereo Speakers	Internal Stereo Speakers
Microphone	Dual Internal microphones	Dual Internal microphones	Dual Internal microphones	Dual Internal microphones
Peripherals Interface	Two USB 3 ports (up to 5 Gbps) Thunderbolt 2 port (up to 20 Gbps) MagSafe 2 power port SDXC card slot	MagSafe 2 power port Two Thunderbolt 2 ports (up to 20 Gbps) Two USB 3 ports (up to 5 Gbps) HDMI port Headphone port SDXC card slot	MagSafe 2 power port Two Thunderbolt 2 ports (up to 20 Gbps) Two USB 3 ports (up to 5 Gbps) HDMI port Headphone port SDXC card slot	MagSafe 2 power port Two Thunderbolt 2 ports (up to 20 Gbps) Two USB 3 ports (up to 5 Gbps) HDMI port Headphone port SDXC card slot
Network Interface	Apple Thunderbolt to Gigabit Ethernet Adapter	Apple Thunderbolt to Gigabit Ethernet Adapter	Apple Thunderbolt to Gigabit Ethernet Adapter	Apple Thunderbolt to Gigabit Ethernet Adapter
Wireless Network Interface	802.11ac Wi-Fi	802.11ac Wi-Fi	802.11ac Wi-Fi	802.11ac Wi-Fi
Bluetooth	Bluetooth 4.0 wireless technology	Bluetooth 4.0 wireless technology	Bluetooth 4.0 wireless technology	Bluetooth 4.0 wireless technology
Energy Savings	Rated EPEAT Gold	Rated EPEAT Gold	Rated EPEAT Gold	Rated EPEAT Gold

Camera	720p FaceTime HD camera			
Optical Drive	None	None	None	None
Weight	2.96 pounds	3.48 pounds	4.49 pound	4.49 pound
Smart Card Reader	FIPS-201 Approved USB Smart Card Reader			

3.3.2.5 Apple Tablet Systems

Apple Tablet Systems		
System Component	iOS Slate	iOS Mini Slate
Model	iPad Air 2	iPad Mini 4
Operating System Type	iOS	iOS
Processor	A8X chip with 64-bit architecture and M8 motion coprocessor	A8 chip with 64-bit architecture M7 motion coprocessor
Display	9.7" Retina LED-backlit Multi-Touch display	7.9-inch (diagonal) LED-backlit Multi-Touch display
Display Resolution	2048—1536 at 264 pixels per inch	2048-by-1536 resolution at 326 pixels per inch
Hard Disk Drive Type	Solid State Drive	Solid State Drive
Hard Disk Drive Size	128 GB	64 GB
Speakers	Internal	Internal
Wireless Network Interface	Wi-Fi (802.11a/b/g/n/ac); dual channel (2.4GHz and 5GHz); HT80 with MIMO	Wi-Fi (802.11a/b/g/n); dual channel (2.4GHz and 5GHz) and MIMO
Bluetooth	Bluetooth 4.0 technology	Bluetooth 4.0 technology
Camera	FaceTime HD camera and iSight camera	FaceTime HD camera and iSight camera
Microphone	Dual microphones	Dual microphones
Connector	Lightening	Lightening
Weight	.96 pounds	.65 pound
Height	9.4 inches	8 inches
Width	6.6 inches	5.3 inches
Depth	.29 inch	.24 inch

3.3.2.20 Smartphones

Business Function – Smartphones fall within the Mobile Computing Systems Logical Grouping of NASA-STD-2805. A category that may sacrifice appreciable functionality for specific form factor benefits and in some instances enterprise interoperability.

Smartphone Minimum Hardware Requirements		
System Component	Component Characteristics	Component Specification(s)
Cellular Connectivity	Domestic US	CDMA, GSM, or 4G
Wireless Connectivity	Bluetooth	
Geographical/Location Services	Assisted GPS and/or cellular triangulation	
Messaging and Calendaring Mail	Native support for NASA-STD-2804 defined messaging and calendaring standards	
Device Security	See Section 3.3.3	

3.3.3 Minimum Mobile Device Requirements

Mobile devices entering NASA's IT environment are required to meet the minimum hardware requirements identified in section 3.3.2 as well as the following minimum mobile device requirements:

- Native support for Microsoft Exchange.
- Centralized management via Microsoft Exchange ActiveSync Policies with specific support for remote wipe capability, password locking, and wipe after predetermined number of bad password attempts.
- Devices connecting to the NASA IT landscape require device encryption.
- Corporate cellular phone licensing and billing agreements.
- Require OEM support on devices.

All new devices and any existing devices that undergo a significant platform revision (i.e. noteworthy operating system upgrade, hardware redesign, etc.) as part of their normal technology evolution are subject to an enterprise interoperability assessment performed by ETADS as well as an Agency-sanctioned Risk Assessment prior to being approved for use.

3.3.4 Smart Card Reader

All HRCs excluding Mobile Systems must include a FIPS-201 Approved Transparent Reader that meets the requirements of NIST SP 800-96, and appears on the GSA's FIPS 201 Approved Product List at:

<http://www.idmanagement.gov/approved-products-list>

In the "Filter by Category" drop down, select "LACS Transparent Reader"

Additionally, the NASA ICAM Device Integration project validates smartcard readers of various interface types for use on NASA computing systems. For more information, see the ICAM Device Integration site:

<https://etads.nasa.gov/IDI>

3.3.5 Energy Savings

Newly procured systems must be EPEAT Gold. See the EPEAT website for the list of registered systems at:

<http://www.epeat.net>

EPEAT evaluates electronic products in relation to 51 total environmental criteria, identified in the Criteria Table below and contained in IEEE 1680 -â€“ 23 required criteria and 28 optional criteria. To qualify for registration as an EPEAT product, the product must conform to all the required criteria.

Products are also ranked in EPEAT according to three tiers of environmental performance: Bronze, Silver, and Gold. All registered products must meet the required criteria, and achieve Bronze status. Manufacturers may then achieve a higher level EPEAT “rating” for products by meeting additional optional criteria as follows:

EPEAT Criteria Table		
Bronze	Silver	Gold
		
Meets all 23 required criteria	Meets all 23 required criteria plus at least 50% of the optional criteria	Meets all 23 required criteria plus at least 75% of the optional criteria

The IEEE 1680 Standard, which forms the basis of EPEAT, requires that every EPEAT registered product meet the current version of the applicable ENERGY STAR standard.

Please refer to [NASA-STD-2804](#) for requirements on how energy-saving features should be configured.

3.3.6 Printers

All printers shall be configured for duplex printing by default. Only printers capable of supporting duplex printing shall be procured.

3.4 Section 508 Compliance Requirements

Hardware products procured after June 21, 2001 must be in conformance with Section 508 of the Rehabilitation Act. Complete information and guidance on addressing Section 508 requirements is available at www.section508.nasa.gov

4 LEGACY AND SUNSETTING HARDWARE

4.1 Cellular Phones

Cellular Phone Minimum Hardware Requirements
Legacy and Sunsetting Technology

Business Function	Cellular phones, which fall within the Legacy and Sunsetting Technology Logical Grouping of NASA-STD-2805 are maintained within the Standards for specification stability purposes to ensure symmetric communication interoperability for end users requiring this functionality.	
System Component	Component Characteristics	Component Specification(s)
Cellular Connectivity	Domestic	CDMA, GSM, or 4G
Data Storage	2 GB card (MicroSD or Mini SD)	
Battery	1000 mAh or higher	
Device Navigation	Built-in pointing device (4-way, trackball, scroll pad)	
Voice Input/output	Integrated earpiece/ microphone/speakerphone, 3.5mm stereo headset capable, Bluetooth headset capable	
Productivity	Calendar, Tasks, Phone Book	
Multimedia	Audio, Video, Images	
Internet Browsing	HTML	
Connectivity	Bluetooth	

4.2 Pagers

Pager Minimum Hardware Requirements		
Legacy and Sunsetting Technology		
Business Function	Pagers, which fall within the Legacy and Sunsetting Technology Logical Grouping of NASA-STD-2805 are maintained within the Standards for specification stability purposes to ensure asymmetric communication interoperability for end users requiring this functionality.	
System Component	Component Characteristics	Component Specification(s)
Cellular Connectivity	Domestic	
Cellular Mode	Single Band	
Message Storage	10 messages minimum	
Display	Date and Time	
Backlight	Yes	
Indicator/Alerts	Alarm/Low battery/Messages	
Service Notification	Ringtone/Vibrate/Silent	
Messaging Display	Time Stamp/# of Messages/Indicator	
Device Navigation	Button(s)	

4.3 Optical Disk Drives

Optical Disk Drives fall within the Legacy and Sunsetting Technology Logical Grouping of NASA-STD-2805. Optical Drives are maintained within the Standards for specification stability purposes to ensure a

minimum level of capability and interoperability for end users requiring this functionality. Optical drives are no longer required for NASA-STD-2805 HRCs unless discretely specified within a NASA-STD-2805 HRC.

4.4 Removable Storage (e.g. Thumb drives)

End users with removable storage requirements must use FIPS 140-2 validated media. Drives shall be cross platform compatible.

4.5 Wireless Aircard Service for Mobile Broadband Internet

USB and Card style devices to connect to mobile broadband internet fall within the legacy and sunsetting technology grouping. These capabilities are being replaced by standalone mobile broadband hotspots, or by mobile smartphone devices that include hotspot capabilities for connectivity sharing.

5 REVIEW AND REPORTING REQUIREMENTS

5.1 INTEROPERABILITY REPORTING

Each Center CIO will establish the necessary processes and tools, both manual and automated, to report on an annual basis to the NASA CIO the hardware and software configuration of all workstations at their respective centers. These data will contain sufficient information to ascertain if the workstation supports NASA employees or is Government-furnished equipment to a contractor, whether the equipment is required to be interoperable, and a description of the hardware architecture/environment. The report will specify the number of NASA employees that do not have access to interoperable workstations.

5.2 Basic Interoperability Standards Maintenance

This standard, and its companion, NASA-STD-2804 Minimum Interoperability Software Suite, are maintained on behalf of the NASA CIO by the Emerging Technology and Desktop Standards group. Together, these standards define the software, hardware, and configurations necessary to ensure basic interoperability within the NASA information technology computing infrastructure.

This standard will be reviewed and updated on an as-required basis, not to exceed 12-month intervals. Participation in the revision process is open to all NASA employees. Details on how to be alerted to changes in the standards and/or comment on proposed updates can be found at

<https://etads.nasa.gov/dcs/>

This site also maintains interim guidance, position papers, software and hardware reviews, recommendations and other documentation intended to promote standardized basic interoperability.

6 DURATION

6.1 Duration

This standard will remain in effect until canceled or modified by the NASA CIO.

7 SUPPORTING DOCUMENTS

7.1 Supporting Documents

Supporting documents and additional information related to this standard may be found at

<https://etads.nasa.gov/dcs/>

<https://etads.nasa.gov/idi/>