# Specification for an Instrument Controller Computer

*This document presents the Atmospheric Radiation Measurement requirements for the instrument controller computer provided with an instrument.*

1. **Instrument Application**
   a. The computer system with the instrument application will provide the necessary functionality to perform instrument control and deliver instrument measurements to the ARM data system.
2. **Data Production, Structure and Delivery Process**
   a. The instrument computer shall generate hourly files of data and metadata (e.g. logs, hardware metadata, etc.). An explanation is required in this proposal if this condition cannot be met.
   b. Data will be delivered in sequential order without duplicate records. Documentation of file formats will be provided prior to delivery. Documentation must be provided on valid data ranges for input checking. Documentation must be provided on error codes/messages.
   c. Files that are to be delivered by the instrument computer to the ARM data system will be placed in a directory that is readable and writeable by the data system.
   d. Data will have a consistent naming convention and extension. The ARM data system will only collect those specific files. This process allows the instrument computer to place "growing" files in the directory and rename them to the agreed convention when the file is complete. The uniqueness of filenames must be guaranteed for an arbitrarily long time series of files.
   e. The data system will remove files as it has collected them from the instrument computer. This process prevents multiple collections of the same data. The instrument may maintain a historical archive in a different directory.
3. **Instrument Computer Requirements**
   a. Operating System requirements
      i. The operating system of an instrument computer will be either Windows or Linux. Either one must be within its support life cycle. The vendor must still be deploying security patches for the operating system.
      ii. ARM may choose to rebuild the delivered system with a secure, ARM standard, configuration of Linux or Windows. The vendor shall state in the proposal any and all instrument OS application dependencies that ARM needs to consider when rebuilding the OS.
      iii. Windows
         (1) Windows 7 Professional Edition is supported. Note that Windows XP support ends in June, 2014. Given that this will give the system a life span of less than three years, it is not supported on new instrument computers.
      iv. Linux
         (1) ARM utilizes CentOS for its systems and has local update repositories at each site to maintain updates. Justification is required to use a different flavor of Linux.
   b. Configuration Requirements
      i. Every instrument computer will host an FTP server for the data system to pick up the data.

ii. Windows computers will use Mozilla Filezilla. Data will be picked up from the computer by the data system from the predefined (and ARM provided) directory using a predefined (and ARM provided) username/password.

iii. Linux computers will use vsftpd. Data will be picked up from the computer by the data system from the predefined (and ARM provided) directory using a predefined (and ARM provided) username/password.

c. Data Storage

i. The instrument computer must be able to hold at least two (2) weeks of data in case of a data system outage.

d. Time Management

i. Accurate time is a necessity in order to have useful data. All instrument computers will run a time service that will sync to the site's local time server.

(1) Windows computers will use Domain Time II.

(2) Linux computers will use ntpd.

e. User account Management and Privileges

i. The usernames/passwords of the instrument computer will be managed by ARM Site Data System (SDS) Staff. These usernames and passwords will be supplied.

ii. The instrument application is to function as a non-privileged user. The application will not require administrator/root access in order to function. Instrument application maintenance/administration will be as a non-privileged user and not require administrator/root access.

f. Security Configuration Requirements

i. The instrument computer will have an operating system that has at least three (3) years left of support (specifically security patches).

ii. The instrument computer must be able to be updated on a weekly basis. Applications/services that cannot be patched without adversely affecting the ability to generate data must be documented. An example would be a Linux instrument computer that has instrument control software compiled against the kernel. Updating the kernel will cause this system to stop producing data. Things such as this must be noted.

iii. Before the computer is put into production, SDS staff will scan and audit the system to ensure that all ARM security requirements are met and ARM standard configuration practices are in place and that it is suitable to be on an ARM network.

g. Virtualization

i. If the instrument controller computer communicates with the instrument via network communications (e.g. IP, Ethernet, etc.), then the instrument computer can be a virtual machine. This eliminates the need for a physical instrument computer.

h. Instrument Application Configuration

i. The instrument application will support the ability to start automatically upon system boot-up without manual intervention. An explanation is required in this proposal if this condition cannot be met.

ii. If the instrument application supports configuration files or a similar mechanism to control instrument operation, it is recommended that a configuration directory be provided such that the ARM data system can update the instrument configuration by depositing new configuration file(s) into the configuration directory. The instrument application would recognize the presence of the new file and reconfigure the instrument based upon the file contents. The vendor's proposal will describe the instrument application configuration management process.

iii. In order to prepare ARM for a system failure, the vendor's proposal will also outline the critical directories so that they can be backed up.

i. Remote Access

i. Remote access to the instrument computer will utilize only secure/encrypted mechanisms.

(1) Windows will use the ARM standard remote access software (will be supplied by SDS staff) and/or SSH (also provided by SDS staff).

(2) Linux systems will use SSH. If access to a graphical user interface (GUI) console is required, it can be tunneled over SSH.

# Appendix

# Print Summary

## Dell OptiPlex XE Small Form Factor - Fully Customizable

**Price** **$971.40**

Preliminary Ship Date: **3/2/2012**

**My Selections** All Options

- **Dell OptiPlex XE Small Form Factor - Fully Customizable**

| | |
|---|---|
| **Date** | 2/21/2012 9:40:08 AM Central Standard Time |
| **Catalog Number** | 16 Retail rc805491 |

| Catalog Number / Description | Product Code | Qty | SKU | Id |
|---|---|---|---|---|
| **OptiPlex XE**: OptiPlex XE Small Form Factor | XESFFG | 1 | [224-8888] | 1 |
| **Operating System(s)**: Genuine Windows® 7 Professional, No Media, 64-bit, English | W7PN61E | 1 | [330-6228][421-5334][421-5606] | 11 |
| **Processors**: Intel® Pentium® Dual Core Processor E5300 (2.60GHz,2M,800MHz FSB) | E5300 | 1 | [317-5864] | 2 |
| **Systems Management Mode**: Broadcom TruManage Systems Management | BRCMTM | 1 | [468-4390] | 13 |
| **Energy Smart Options**: No Dell Energy Smart Power Management Settings. This item is not Estar qualified. | NOESMRT | 1 | [467-3564] | 25 |
| **Power Supply**: Up to 88 Percent Efficient Power Supply | PSSFF88 | 1 | [313-9303] | 20 |
| **Memory**: 4GB DDR3 Non-ECC SDRAM,1333MHz, (2 DIMM) | 4G3N332 | 1 | [317-3555] | 3 |
| **Video Cards**: Integrated Video, Intel® GMA 4500, DisplayPort/ VGA | INTVID | 1 | [468-6524] | 6 |
| **Monitors**: No Monitor | NMON | 1 | [320-3704] | 5 |
| **Keyboard**: Dell KB212-B USB 104 Quiet Key Keyboard,English | USBEE | 1 | [331-2024] | 4 |
| **Mouse**: Dell MS111 USB Optical Mouse | USBOP | 1 | [330-9458] | 12 |
| **Thermal**: Heat Sink, Performance, Small Form Factor | HSSFF | 1 | [330-7383] | 17 |
| **SHIPPING PACKAGING OPTIONS**: Shipping Material for System, Small Form Factor | SFFSHIP | 1 | [330-7380] | 41 |
| **Boot Hard Drives**: | | | | |

| | | | | |
|---|---|---|---|---|
| 500GB SATA 3.0Gb/s and 16MB DataBurst Cache™ | 500S | 1 | [342-0233] | 8 |
| **Removable Media Storage Device**: 8X Slimline DVD-ROM, Data Only | DVD8SO | 1 | [313-8692] | 16 |
| **System Recovery**: Dell Back-up and Recovery Manager for Windows 7 | DBRM71 | 1 | [331-3300] | 47 |
| **Hard Drive Mode**: No RAID | NORAID | 1 | [468-6525] | 15 |
| **Setup and Features Information Tech Sheet**: Tech Sheet, English | TSHENG | 1 | [330-7381] | 40 |
| **DOCUMENTATION**: Opti Documentation, English | DOCENG | 1 | [330-1710][330-1711] | 21 |
| **Speakers**: No Speaker, OptiPlex | NSPK | 1 | [313-4825] | 18 |
| **Resource DVD**: No Resource DVD | NORCD | 1 | [313-3673] | 27 |
| **Security Hardware**: Chassis intrusion switch option | SWITCH | 1 | [330-8342] | 26 |
| **Federal Keep Your Hard Drive**: Federal Keep Your Hard Drive Service, 3 YEAR | KHDFED3 | 1 | [984-0102] | 34 |
| **Hardware Support Services**: 3 Year Basic Limited Warranty and 3 Year NBD Onsite Service | U3OS | 1 | [908-0278][908-0447][908-4262][909-6580] | 29 |

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