



## Instrument Readiness Review (IRRv4 July 27, 2012)

This form is to be used for a new ARM baseline instrument or significant upgrade to an ARM baseline instrument. Please complete the General Information portion of this form so that Fixed Site and Mobile Facility Operations, the Data System and Engineering, the Data Quality Office, and the Archive staff can properly plan all instrument and data/metadata requirements and approve the transition of instrument ownership from Mentor to ARM Infrastructure. An approved Engineering Change Request (ECR) for each new instrument starts the process. An approved Baseline Change Request (BCR) transfers all instrument responsibilities from Mentors to ARM Infrastructure and completes the process.

The IRR is only part of the process to establish a new ARM baseline instrument at an ARM Fixed Site or Mobile Facility. The complete process is provided for Mentors in the Project Guide Plans for an ARM Instrument Development or Modification (<https://engineering.arm.gov/task/project-guide-plans.php>).

Please complete one Instrument Readiness Review form per instrument, answering all questions as completely as possible, and attaching this form to the appropriate ECO. If you feel a question is not applicable to your deployment, we ask that you please write "NA": leaving blank results in ambiguity.

This form consists of 8 Sections:

1. General Information needed about the instrument;
2. Deployment/Removal Support Needs for installation at fixed or mobile sites;
3. Data Connections for collection and ingest development;
4. Data/Metadata Information;
5. Electrical Requirements;
6. Operational and Maintenance Support requirements;
7. Safety; and
8. Instrument Handoff Requirements Checklist.

The IRRv3 addresses: 1) general information provided by the Mentor needed for the ARM Infrastructure to support a new instrument and 2) provides a Mentor checklist of required tasks before the instrument is handed off to operations. The form is by no means exhaustive, but the information you supply will help generate the dialog needed for the ARM Infrastructure to understand supporting requirements to design collections and ingests, to identify and provide engineering support for data formats and supporting metadata, to identify data quality problems, to announce new data streams to the ARM Climate Research Facility, and to provide information needed to safely install, operate, and maintain the new instrument at fixed sites and/or mobile facilities.

### **The completed IRR does not release all responsibility for the instrument from Mentor to the ARM Infrastructure.**

The IRR is used to generate sufficient information for formal approval by the follow ARM Infrastructure managers. Formal handoff from Mentor to ARM Infrastructure must be obtained from the following ARM Infrastructure managers:

- Manager of the Data Processing Facility (Nicole Keck) who will coordinate data collections and ingests and processing issues,
- Site Data System Manager (Cory Stuart) for all instrument interface with local fixed site and mobile facility data systems,
- Data Quality Manager (Randy Pepler) for all appropriate algorithm requirements for their data review responsibilities,
- Appropriate Fixed Site (Mark Ivey: NSA, Kim Nitschke: TWP and ENA, and Doug Sisterson: SGP) and Mobile Facility Managers (Kim Nitschke: AMF1, Nicki Hickmon: AMF2, and Mark Ivey: AMF3) for all operations, maintenance, and calibration needs; and
- Archive Manger (Raymond McCord) to prepare for the new data streams for storage and program metrics responsibilities and notices for new data releases.

All approvals must be provided by the managers listed above and that approval provided in the ECO. The ECO is complete when all approvals have been obtained. The Mentor submits the Baseline Change Request for the new instrument, which upon approval, established the date of the official handoff for Mentor to the ARM Sites and Mobile Facilities for operation and all ARM Infrastructure support. The Mentor is responsible for getting the approvals.

**Cautionary Note: Any change or substitution to the information described in this Instrument Readiness Review will require further evaluation by Site Operations, Site Data System Manager, Data Processing Manager, Data Quality Manager, Fixed Site and Mobile Facility Site Managers, and the Archive Manager before the instrument may be energized and operated.**

1. General Information	Mentor Entries
Instrument Name:	IRTSST
Instrument Mentor Name:	Victor Morris
Instrument Developer Name:	Heitronics
Affiliation:	PNNL
Mentor Address:	P.O. Box 999, Richland WA 99352
Mentor Phone Number:	509-372-6144
Fax Number:	509-375-6448
Email address:	victor.morris@pnnl.gov
<b>ECO number:</b>	ECO-873, EWO-14307, EWO-14305
Related Site(s) – Identify all sites and facilities where this instrument will be permanently deployed as [SGP, NSA, TWP, ENA, AMF1, AMF2, AMF3 (Oliktok).]	AMF2
Brief description of instrument and measurements:	Up-welling and down-welling infrared thermometers to measure the radiance of sea surface and sky brightness for the purpose of deriving sea surface temperature
<b>NOTE: It is highly recommended that you get in touch with the ARM SDS Manager to assist in specifications of instrument computers BEFORE ordering instrumentation. Have you contacted the ARM SDS Manager?</b>	Yes
<b>Will the instrument require a design review before procurement?</b>	No
If no review is needed, please provide justification.	Reconfiguration of existing GNDRAD IRT and SKYRAD IRT
Is deployment stand-alone or need to be grouped with other instruments?	Stand-alone
<b>Is your instrument part of the AMF2 baseline group of instruments that would be used for shipboard deployments?</b>	Yes
Will the measurements from the instrument become a production ARM data stream?	Yes
Will measurements feed an existing VAP?	No
Will data output need to have a VAP for data to be useful?	Yes
Will the data be collected and ingested by an ARM Data system?	Yes

Will the data be passed to ARCHIVE through the ARM Data system?	Yes
Brief description of your operations plan:	Measurement of analog output of up-welling and down-welling infrared thermometers by Campbell CR1000 Datalogger

<b>2. Implementation Support Needs</b>	<b>Mentor Entries</b>
Where will you have the vendor ship the instrument for testing and validation of instrument specifications?	ANL
Does the instrument conform to the Vendor specifications?	Yes
If instruments are to be shipped to an ARM Site or Facility, please indicate your planned arrival and departure dates (Reminder: A Site Access Request must be submitted and approved for each person requiring access to an ARM site to support this instrument deployment <a href="http://www.db.arm.gov/SARS/">http://www.db.arm.gov/SARS/</a> )	n/a
How will your equipment be shipped/transported to the site? (e.g. Yellow Freight, FedEx, private car/truck, etc.).	FedEx
If being shipped to an ARM Site or Facility, have you filled out as shipping request?	n/a
Are there any hazardous components that need to be identified for shipping?	No
Size and weight of equipment?	2 each, 24x7x14 cm, 2.4 kg
Will your equipment need to be stored prior to set up?	Yes
Will your shipping containers need to be stored for shipping for repairs/calibrations? If yes, please indicate number and size.	Yes, 60x30x15 cm
Will you need site operations personnel assistance to unload, load, or transport your equipment on-site?	Yes
Will you need any special services for unloading/loading your equipment (e.g., crane, forklift or other special services, etc.)? If so, arrangements with site operations must be made at least 4 weeks in advance.	No
What is the desired location for your instrument? Maps are available at: <ul style="list-style-type: none"> <li><a href="http://www.arm.gov/sites">http://www.arm.gov/sites</a></li> </ul>	Overlooking side of ship
Are there any other specific deployment support needs (e.g., major site preparation such as power poles, fencing, foundations, lightning protection, etc.).	Yes, integration with Campbell CR1000 Datalogger

What is the vertical field of view (FOV) of your equipment? <ul style="list-style-type: none"> <li>• hemispheric FOV</li> <li>• narrow FOV – zenith pointing</li> <li>• narrow FOV – solar tracking</li> <li>• narrow FOV – scanning (describe)</li> <li>• other (describe)</li> </ul>	Zenith, 2.64 degrees Nadir, 30.51 degrees
Does your equipment require a specific alignment?	Yes
What fetch or surrounding terrain/land use do you require?	n/a
What other instruments does your equipment need to be co-located with?	Infrared Seasurface Temperature Autonomous Radiometer
Could your equipment generate or be susceptible to interference (radio frequency, electromagnetic, acoustic, aerodynamic, etc) with ARM or other guest instruments?	No
Are there any other location “siting” considerations?	
Do you intend to mount your equipment on an existing concrete pad, platform, tower, stand, solar tracker, etc? If so, please identify location.	Yes, side rail
Do you intend to provide your own platform, tower, stand, solar tracker, etc.?	No
Will you need assistance from site operations personnel to set up, mount, or install your equipment?	Yes
Will you need an environmentally controlled shelter for your equipment or computer system?	No
Will you be providing a shelter for your equipment?	Yes
Will you need any utility (other than power) support? (water, gases, renewables, etc.)	No
<b>3. Data Connections</b>	<b>Mentor Entries</b>
Do you require connection(s) to ARM site networks and/or your instrument?	Yes
Identify the number of connections you require to the ARM network.	1
If you require a connection, specify the types of systems and operating systems where applicable (e.g., CR1000 data logger, PC running windows 7 Professional, PC running CentOS Linux 6.2, etc.)	Campbell CR1000 Datalogger
What is the planned method of data delivery to the data system? (ftp, serial, etc.)	Serial

What network services will run on the instrument PCs (e.g., ssh/scp (secure shell/secure copy), ftp (file transfer), http/https (web server), etc.).	ftp
What volume of data do you plan to transfer?	192 kB/hour
<b>NOTE: Before any instrument computers are connected to the ARM network, ARM SDS will provide a security inspection.</b>	<b>The ARM SDS will ensure that your instrument is compliant with the Argonne ARM Cyber Security Plan. You are responsible for ensuring that the instrument computer is current with software patches, user account controlling the instrument does NOT have administrative privileges, and verify that no unnecessary or insecure services are running on the network. ARM SDS will verify this and update/reconfigure accordingly</b>
<b>NOTE: instrument computers must be ARM approved. Have your instrument computers been approved?</b>	n/a

<b>4. Data/Metadata Information</b>	<b>Mentor Entries</b>
What will the data format be?	ASCII
What will the data size be?	192 kB
What will the data name be?	IRTSST_Table212 and IRTSST_Table214
What is the expected daily volume of data?	4610 kB
At what frequency (milliseconds, seconds, minutes, etc.) will data from the instrument be available to the data system?	1 s
What is the location of the data on the instrument?	CR1000 final storage
What is file naming convention?	IRTSST_Table212 and IRTSST_Table214
What is data/metadata file structure?	Comma-delimited ASCII
Have sample data files been provided to the collection and ingest developers?	Yes
Have sample data been provided to the Data Quality Office to determine what information is required for data quality reviews?	Yes
Please provide a brief description of each instrument system to be associated with an IP address.	PC running Campbell LoggerNet software to collect data from CR1000
Please provide any information you feel is necessary to support your deployment.	The GNDRAD IRT and SKYRAD IRT will be mounted at 45 deg to one another; one pointing downward toward the ocean surface, the other pointing upward
<b>If shipboard deployment, does your instrument need positioning and motion correction?</b>	Yes
<b>If shipboard deployment, does your instrument come complete with positioning and motion correction software?</b>	No
<b>If not, can your instrument be corrected for position and motion if such external information is provided?</b>	Yes

<b>If not, your instrument will need motion stabilization. What are your stabilized instrument platform needs?</b>	n/a
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<b>5. Electrical Requirements</b>	<b>Mentor Entries</b>
Will you need to connect to site AC power? If yes, please answer the following for EACH LOAD you wish to connect to the site AC power. In the event your equipment is contained in a single rack, enclosure, or trailer, that is fed by a single power cord, it is only necessary to provide the details of that main power feed.	Yes
What is the voltage of each load?	105 – 125 VAC
What is the frequency of each load?	50 – 400 Hz
What is the amperage of each load?	300 mA
What is the phase of each load?	single
Are your AC power requirements other than 120 Volt AC, 60Hz, single phase (NEMA plug type 5-15P or 5-20P? If yes, please provide the NEMA plug type(s).	No
Has your AC-powered equipment been inspected and certified as safe by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories?	Yes
Please list those pieces of your AC-powered equipment that have not been inspected and certified as safe.	none
<b>NOTE: If your equipment has not been listed by a Nationally Recognized Testing Laboratory (NRTL), it must be examined and approved by a Designated Electrical Equipment Inspector at the fixed site or mobile facility.</b>	<b>Even if your institution inspects and provides a letter of inspection and certification, a Site Operations Designated Electrical Equipment Inspector will inspect and re-certify that your instrument is electrically safe at the site/facility of operation.</b>
<b>6. Operations and Maintenance Support</b>	<b>Mentor Entries</b>
What level of support do you require Site staff support operations and maintenance? (e.g. for cleaning, alignment, calibration, data collection/transfer, rebooting computers, etc) If so, please describe the following: <ul style="list-style-type: none"> <li>• Tasks, frequency, and time to complete</li> <li>• Documentation / procedures available</li> <li>• Training, description and dates</li> </ul>	Daily inspection/cleaning of lenses and mirror

<p>Will you need any Site tools or parts?</p> <ul style="list-style-type: none"> <li>• Hand tools (screwdrivers, hammers, etc)</li> <li>• Specialty tools (soldering iron, etc)</li> <li>• Electrical / electronic parts</li> <li>• Test / calibration equipment (oscilloscope, etc)</li> <li>• Simple hardware (nuts, bolts, screws, etc)</li> <li>• Simple building materials (lumber, plywood, etc)</li> </ul>	No
<p>Will you need any furnished expendable supplies? (If yes, which and what quantity)</p> <ul style="list-style-type: none"> <li>• Specialty gasses – He, N<sub>2</sub>, dry air, etc</li> <li>• Cryogenics – liquid N<sub>2</sub>, dry ice, etc.</li> <li>• Deionized or distilled water</li> <li>• Cleaning materials</li> </ul>	Yes, distilled water and canned air

<b>7. Safety</b>	<b>Mentor Entries</b>
Does any of your equipment incorporate a laser? (If yes, please provide the class, wavelength, output power, restricted area requirements, eye safe range)	No
Does this equipment emit microwave energy or ionizing sources of any kind? (If yes, please provide the frequency, output power level, ionizing emissions, restricted area requirements, etc.)	No
Does this equipment emit acoustic energy of any kind? (If yes, please provide the output dB, and restricted area requirements.	No
Does the equipment incorporate nuclear material or emit ionizing radiation? (If yes, indicate the isotope, amount, type of emission (alpha, beta, gamma, X-ray, etc), activity level, containment, and handling procedures.)	No
Will any work be performed at an elevated area (workers feet more than 4 feet above ground level) for the installation and/or operation of this equipment?	No
Will you be bringing/using any compressed gases?	No
Will you be bringing/using any cryogenics (e.g. liquid nitrogen or dry ice)?	No
Will you be bringing/using chemicals (reagents, solvents)? If yes, please indicate which chemicals, their quantities, their purpose, and describe how you plan to store, handle and dispose of them)	No

What personnel protective equipment (PPE) are you bringing to facilitate the safe handling of the chemicals?	none
Will you be bringing/using any other hazardous materials? Unless arrangements are made, you are responsible for removal of hazardous materials you bring to the sites or mobile facilities.	No
Will there be any waste generated by the operation of this equipment?	No
Will you be bringing any safety equipment for your operation? (i.e., fire extinguishers, safety glasses/goggles/face masks, etc)	No
Will you be bringing any safety signs for your operation? (i.e., Restricted area, microwave radiation, etc)	No
Are there any other safety-related issues associated with your activities while on-site?	No

<b>8. Instrument Handoff Requirements Checklist</b>	<b>Mentor Entries</b>
Have you completed Sections 1-7?	Yes
Have you completed and submitted the ARM Instrument Handbook for posting on the ARM web page?	No
Have you conducted training with the appropriate fixed site and mobile site operations staff?	Yes
Have all instrument systems, components, and spare parts been entered into the Operations Status System (OSS) database?	Yes
Have you verified all new DMF processed data from the instrument for release to the Archive?	Yes
Have you reviewed and approved the Data Quality Office automated algorithms to be used for weekly data quality reviews?	Yes
<b>Have you prepared the new data release statement for the Archive?</b>	No
<b>BCR Number:</b>	ECR-970