IMAGE QUALITY ASSURANCE PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANADATORY

This 480th Intelligence, Surveillance, and Reconnaissance Wing (480 ISR WG) Instruction implements Air Force Policy Directive (AFPD) AFPD 14-1, *Intelligence, Surveillance, and Reconnaissance (ISR) Planning, Resources, and Operations.* It establishes procedures and responsibilities for managing Imagery Quality (IQ) program initiatives at all Wing staff office and subordinate units. This instruction applies to all 480 ISR WG staff offices and 480 ISR Wing-subordinate units involved in the exploitation of imagery. It does not apply to 480 ISR Wing-gained Air National Guard or Air Force Reserve units. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendations for Change of Publication*; route AF Form 847s through the appropriate chain of command. Supplements to this instruction must be sent to the higher headquarters functional OPR for review and coordination before publishing. Unless otherwise specified in this instruction, 480 ISR WG/CC is the waiver authority for this instruction. Request waivers through the appropriate chain of command to 480 ISR WG/DO. All waivers must include a background, justification, and get well plan. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, Management of Records, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfm**. Contact supporting records managers as required.

Chapter 1

MISSION AND RESPONSIBILITIES

1.1. Mission. The 480 ISR WG's mission, as the lead wing for Air Force Distributed Common Ground System (AFDCGS), involves the exploitation of imagery from global distributed and reach back ISR systems. This operationally requires the 480 ISR WG to exploit imagery from multiple data sources, produce a variety of intelligence products, and support war-fighters in various theaters. The responsibility placed on 480 ISR WG exploitation units for general and time-sensitive exploitation of national and airborne imagery requires it to maintain assets in accordance with Air Force and National Geospatial-Intelligence Agency (NGA) standards.

1.1.1. As part of its mission, the Wing is required to maintain the quality of both film and digital-based imagery utilized across the Wing's exploitation facilities. This involves ensuring end-to-end Image Quality (IQ) throughout the image chain supporting 480 ISR WG DCGS and non-ISR mission requirements to provide consistency across the Wing's intelligence operations. In order to ensure image quality performance through an ISR imaging enterprise, it must be addressed across the end-to-end collection, distribution, and exploitation architecture from sensor to end-user. To achieve this objective, the USAF must incorporate IQ initiatives into the design, build, and operational life cycle of the end-to-end enterprise. This is achieved be threading IQ initiatives across the enterprise and stakeholder organizations. The purpose of this operating instruction is to establish formalized IQ initiatives within the 480 ISR WG, to maintain local site architectures, in addition to supporting efforts across external stakeholder organizations to ensure end-to-end IQ performance of the ISR enterprise.

1.2. Responsibilities. This instruction directs actions, assigns responsibilities, and prescribes procedures for sustaining consistent IQ from the Air Force Intelligence, Surveillance, and Reconnaissance (AF ISR) assets within the 480 ISR WG enterprise.

1.2.1. 480 ISR WG:

1.2.1.1. 480 ISR WG/DO:

1.2.1.1.1. Execute overall management of the 480 ISR WG IQ Assurance Program.

1.2.1.1.2. Establish, in writing, an Image Quality Program Director (IQPD) position to provide subject matter expertise to the Wing and develop and implement an IQ program to support mission operational efficiencies.

1.2.1.2. 480 ISR WG/DOO - Image Quality Program Director:

1.2.1.2.1. Focal point for IQ operations within the Wing.

1.2.1.2.2. Interface and coordinate with internal and external AF ISR architecture stakeholders and IQ programs. Advocate for the threading of IQ initiatives across architecture life cycles to ensure developmental and operational ISR assets continue to perform at a level that meets 480 ISR WG operational mission requirements.

1.2.1.2.3. Interface and coordinate with external AF ISR architecture stakeholders in order to integrate 480 ISR WG IQ sustainment initiatives with existing IQ programs and enterprise sustainment activities.

1.2.1.2.4. Establish and implement an IQ sustainment program within 480 ISR WG. Provide guidance on the IQ sustainment initiatives to implement within the 480 ISR WG to ensure ongoing IQ performance of the DCGS architecture.

1.2.1.2.4.1. Monitor IQ performance status feedback provided by Group Image Quality Program Monitors (IQPMs).

1.2.1.2.4.2. Coordinate with external ISR enterprise stakeholders to communicate and advocate for the correction of 480 ISR WG IQ concerns.

1.2.1.2.4.3. Track the investigation and mitigation of IQ issues that are reported by Distributed Ground Station (DGS) facilities.

1.2.1.2.4.4. Report to IQPMs information regarding IQ performance issues, mitigation status, and IQ program updates.

1.2.1.2.5. Support community forums and working groups necessary to manage IQ initiatives within the ISR enterprise.

1.2.1.2.6. Oversee the delivery of relevant IQ data to external AF ISR stakeholders in support of enterprise IQ initiatives.

1.2.1.3. 480 ISR WG/XC:

1.2.1.3.1. Ensure all new or upgraded architecture configurations are tested against IQ requirements prior to operational implementation.

1.2.1.4. 480 ISR WG/DOT:

1.2.1.4.1. Obtain and implement IQ training in the appropriate training courses for architecture maintainers and Geospatial Analysts (GA). The IQPD will coordinate with 480 ISR WG/DOT personnel on the incorporation of IQ related training materials.

1.2.2. Groups will:

1.2.2.1. Establish, in writing, an IQPM and alternate as an additional duty position whose responsibility will be to implement the 480 ISR WG IQ program Tactics, Techniques, and Procedures (TTP) and to advise the Wing IQPD on architecture status and subordinate squadron's ability to execute IQ program initiatives. Appointment letters are to be forwarded to the 480 ISR WG IQPD. Updated appointment letters should be sent to the IQPD when changes in IQPM assignments are needed.

1.2.2.2. Delegate to the appropriate Group and/or Squadron personnel, the maintenance and operational responsibilities detailed in this section. If responsibilities require coordination with entities outside the Group (for items such as facility lighting), a Group or Squadron representative should be assigned to coordinate that support.

1.2.2.3. Publish and maintain a local supplement as required for implementation and execution of 480ISRWI 14-1011. Units will forward a copy of all local publications to

the 480 ISR WG IQPD and 480 ISR WG/DOO within 30 days from date of publication or revision of this supplement.

1.2.2.4. Ensure compliance with instructions, directives, guidance, and policies associated with the IQ program; to include those listed in Chapter 3.

1.2.2.5. Ensure IQ initiatives are incorporated into established programs for the maintenance and operation of exploitation facilities and equipment to include personnel training initiatives.

1.2.2.6. Ensure new and modified facility designs and architecture deliveries incorporate validation of IQ performance requirements.

1.2.2.6.1. Make every effort to comply with the most up to date versions of NGA's standardization document *Softcopy Exploitation Facility Standard* and NGA's *Softcopy Facility Guidelines* document referenced in Chapter 3 section 3.2.1 on facility designs effecting an operations floor.

1.2.2.6.2. Groups will coordinate with 480 ISRW/DOO and 480 ISRW/CE on facility design affecting the ops floor.

1.2.2.7. The waiver authority with respect to meeting facility lighting requirements is the Group CC. Background, justification, and get well plan for waiver should be forwarded to 480 ISR WG/DOO and 480 ISR WG IQPD.

1.2.2.8. Execute day-to-day operations to maintain IQ performance of the architecture and manage compliance with program initiatives.

1.2.2.9. Assign appropriate trained manpower and resources to execute IQ program initiatives.

1.2.2.10. Advise the Group CC on ability to execute IQ program initiatives.

1.2.2.11. Provide oversight of their respective unit IQ initiatives.

1.2.2.12. Ensure IQ program components are included in established programs for maintaining, training and evaluating personnel assigned to intelligence activities.

1.2.2.13. Ensure compliance with instructions, directives, guidance, and policies associated with the IQ program instructions; to include those listed in Chapter 3.

1.2.2.14. Publish, if required, unit-specific IQ program instruction that supplements this instruction. Created supplements should be coordinated with the Group designated IQPM and need to be forwarded to the 480 ISR WG IQPD and 480 ISR WG/DOO within 30 days of being published or revision of this supplement.

1.2.2.15. Report results and status of IQ program initiatives to Group CC and Group IQPM.

1.2.2.16. Implement training on IQ issues and procedures to Subject Matter Experts (SME), GAs, and site maintainers.

1.2.2.16.1. Train GAs to understand how to identify and communicate issues with IQ that impact their mission.

1.2.2.16.2. Train maintenance personnel on procedures to sustain the performance of the exploitation systems and facilities and how to troubleshoot any IQ issues that arise.

1.2.2.16.3. Train quality control personnel on how to identify, monitor, and assess IQ performance and troubleshoot any IQ issues that arise.

1.2.2.17. Implement IQ sustainment initiatives into both operations and maintenance activities to include pre-mission, post-mission, and Preventative Maintenance Initiatives (PMI).

1.2.2.18. Develop and incorporate IQ performance checks as part of pre-mission procedures in accordance with established 480 ISR WG IQ program procedures and NGA and AF guidance.

1.2.2.18.1. Conduct facility lighting checks in accordance with the most up-to-date version of NGA's standardization *Softcopy Exploitation Facility Standard* referenced in Chapter 3 section 3.2.1.

1.2.2.18.2. Conduct a softcopy display performance check to ensure compliance with the most up-to-date version of NGA's standardization document *Display Performance Standards* referenced in Chapter 3 section 3.2.2.

1.2.2.18.2.1. Prior to a mission GAs will check calibration sticker on display or verify calibration with maintenance personnel using other means to ensure it is current. Expired calibration stickers should be brought to the attention of the Mission Operations Commander (MOC) and relayed to appropriate maintenance personnel for mitigation.

1.2.2.19. Conduct an exploitation workstations performance check by developing and implement checklists as guidance becomes available on workstation configurations, to include software settings. The objective is to ensure exploitation workstation IQ performance meets NGA's standardization document *Softcopy Image Processing Standard* referenced in Attachment 1.

1.2.2.20. Conduct a dissemination system check as tools and techniques become available.

1.2.2.21. Inform the MOC of results from pre-mission exploitation systems IQ performance checks. Inform the IQPM and maintenance personnel of any noted issues so that they may be addressed.

1.2.2.22. Identify when IQ issues are impacting a mission.

1.2.2.22.1. Monitor for IQ issues as part of exploitation activities.

1.2.2.22.2. Identified artifacts or anomalies will be flagged, via UNICORN or alternate method when UNICORN is unavailable, and images and related information for new or significant issues will be stored for reference.

1.2.2.22.3. Notify appropriate personnel of IQ issues during mission that impact Essential Elements of Information (EEIs), are new, or present significant issues so it may be included in PMS report.

1.2.2.23. Maintain exploitation system and facility performance in accordance with established standards, Wing policies, guidance, and procedures; to include those listed in Chapter 3. This is established by incorporating IQ initiatives into the appropriate PMI events.

1.2.2.23.1. Monitor and maintain facility environment to image exploitation standards.

1.2.2.23.1.1. Ensure ambient lighting is maintained to prescribed exploitation facility standards as specified in Chapter 3 section 3.2.1.

1.2.2.23.2. Maintain exploitation systems in accordance with prescribed IQ performance standards.

1.2.2.23.2.1. Monitor and calibrate displays monthly in accordance with the most up to date version of NGA's standardization document *Display Performance Standard* referenced in Chapter 3 section 3.2.2.. Requirement provided, and can be modified by WR-ALC/HBGB's Enterprise Image Quality Verification Program (EIQVP) and is current as of this writing. Group/CC is the waiver authority with respect to meeting exploitation display calibration requirements. Background, justification, and get well plan for waiver should be forwarded to 480 ISR WG/DOO and 480 ISR WG IQPD.

1.2.2.23.2.1.1. On the 5th duty day of each month, email **caldata@exelisinc.com** the CALTOOL display maintenance database for EIQVP review. This requirement is current and can be modified by 480 ISR WG/DOO or 480 ISR WG/LG.

1.2.2.23.2.2. Maintain exploitation workstation equipment to prescribed image processing standards.

1.2.2.23.2.3. Periodically pull test imagery through dissemination architecture to verify that IQ performance is being maintained.

1.2.3. Group Image Quality Program Monitor will:

1.2.3.1. Oversee implementation and compliance with instructions and procedures set forth in the 480 ISR WG IQ program.

1.2.3.2. Advise the Group CC and 480 ISR WG IQPD on subordinate squadrons' ability to execute IQ program initiatives.

1.2.3.3. Advise the Group CC and 480 ISR WG IQPD on architecture IQ performance and mitigation status.

1.2.3.4. Oversee and conduct the production and maintenance of supplements necessary to implement IQ program initiatives. Send a copy of published supplements to IQPD and 480 ISRW/DOO within 30 days from date of publication or revision of this supplement.

1.2.3.5. Oversee incorporation of IQ initiatives into established programs for the maintenance and operation of exploitation facilities and equipment to include personnel training initiatives.

1.2.3.6. Oversee and coordinate IQ program initiatives within the Group.

1.2.3.6.1. Ensure IQ training is implemented within the Group.

1.2.3.6.2. Ensure new and modified facility design or architecture deliveries make every attempt to meet requirements listed in the most up to date versions of NGA's standardization document *Softcopy Exploitation Facility Standard* and NGA's *Softcopy Facility Guidelines* document referenced in Chapter 3 section 3.2.1.

1.2.3.7. Ensure IQ sustainment initiatives are implemented within exploitation facilities.

1.2.3.7.1. Ensure every effort is made to sustain the exploitation facility environment to IQ standards as outlined in NGA's standardization document *Softcopy Exploitation Facility Standard* and NGA's *Softcopy Facility Guidelines* documents referenced in section 1.2.3.6.2. and Chapter 3 section 3.2.1.

1.2.3.7.2. Ensure exploitation facility equipment is maintained to IQ standards listed in Chapter 3 section 3.2.2.

1.2.3.7.3. Implement internal initiatives and support external efforts to ensure the ISR imagery collection and dissemination architecture is operating at optimal performance levels.

1.2.3.7.4. Ensure the delivery of mission data into AF IQ programs for the ongoing IQ analysis of sensor and dissemination system performance listed in Chapter 3 section 3.2.3.

1.2.3.8. Track and trend local exploitation performance by monitoring and evaluating locally collected IQ performance information. Provide trend reports to 480 ISR WG/DOO and IQPD.

1.2.3.8.1. Monitor facility and equipment performance measurements conducted by maintenance personnel to ensure compliance with Chapter 3 sections 3.2.1 and 3.2.2.

1.2.3.8.2. Review, monitor, and assess the IQ performance of missions in coordination with local quality control personnel.

1.2.3.8.2.1. Review and assess any image artifacts or anomalies flagged during mission.

1.2.3.8.2.2. Review and assess any IQ performance concerns noted in Post Mission Summary (PMS) reports.

1.2.3.8.2.3. Collect image examples and related support information for newly identified artifacts or anomalies or in cases where known artifacts or anomalies impact have significantly increased their impact on the mission in accordance with AFISRAI14-122_480ISRWSUP .

1.2.3.9. Address and coordinate support for troubleshooting identified IQ issues at the local level.

1.2.3.10. Communicate and coordinate with internal and external ISR stakeholders and IQ program personnel on local facility performance and related IQ issues.

1.2.3.10.1. Elevate IQ issues that cannot be addressed at the local level to the 480 ISR WG IQPD. Coordinate submission of Discrepancy Reports (DRs) as necessary.

1.2.3.10.2. Function as the primary POC when external ISR stakeholders provide on-site IQ related support. Function as main IQ representative with internal and external personnel for on-site events, to include testing, training, maintenance, and troubleshooting activities.

1.2.3.11. Provide 480 ISR WG IQPD monthly status on local exploitation facility IQ performance on the preapproved formats to include gathered IQ performance data. The requirements and format for the IQPD monthly status report can be found on the 480 ISR WG SPIR SharePoint web page: 480 ISR WG SIPR home page, SharePoint Portal, DO, DOO, GEOINT Guidance and Directives, IQ

1.2.3.12. Communicate IQ information updates obtained from outside sources to the appropriate local personnel.

1.2.3.12.1. Troubleshoot any identified IQ issues to find and correct any local cause. If issue is not local, elevate concern to appropriate external personnel to include the IQPM.

1.2.3.13. Collect and deliver mission data on a periodic, and as requested on an ad hoc, basis for IQ analysis as specified by Higher Headquarter (HHQ) guidance.

1.2.3.13.1. IQPM should coordinate with 480 ISR WG IQPD and WR-ALC/HBGB on latest mission data submission requirements as outlined in Chapter 3 Section 3.2.3.

1.2.3.13.2. Communicate with internal and outside ISR stakeholders and IQ program personnel on local facility performance and related IQ issues.

1.2.3.13.3. Communicate status of ongoing IQ maintenance support to Squadron CC and IQPM.

1.2.3.13.4. Collect and report on the details surrounding any IQ related problems using UNICORN and any other prescribed reporting forms.

1.2.3.13.5. Support IQ related visits by external organizations and IQ programs providing support for local exploitation facilities performance to include testing, training, maintenance, and troubleshooting events.

1.2.3.13.5.1. Provide IQPM monthly status on local exploitation facility IQ performance to include gathered IQ performance data.

Chapter 2

LIFE CYCLE APPROACH TO IMAGE QUALITY FOR ISR ENTERPRISE

2.1. Achieving end-to-end IQ. The approach involves including IQ initiatives in the design, build, and operational life cycle stages of the collection, dissemination, and exploitation architecture. The topic of IQ must be addressed during each phase of the architecture development life cycle to ensure the goal of end-to-end IQ. In order to thread IQ through the architecture, the 480 ISR WG must maintain the IQ performance of its operations while actively coordinating with stakeholders responsible for IQ in developmental and operational ISR architecture components.

2.2. 480 ISR WG IQ Assurance Program. This approach involves the 480 ISR WG establishing an IQ assurance program within the Wing to maintain and monitor the IQ architecture performance to optimize operational effectiveness. By leveraging IQ requirements, metrics, and tools developed by collection systems, the IQ performance thread can be maintained through the dissemination and exploitation architecture. Integrating IQ initiatives from the front-end of the AF DCGS architecture and establishing internal processes will thread IQ from target to analyst exploitation.

2.2.1. This program provides a methodology for understanding the system's IQ performance and a mechanism to control and maintain that performance. The methodology includes:

2.2.1.1. Coordinate with ISR stakeholders and IQ programs to thread IQ through the AF ISR enterprise.

2.2.1.2. Advocate for overarching AF guidance that threads IQ efforts across the ISR enterprise life cycle to include both acquisitions and sustainment.

2.2.1.2.1. Advocate for the inclusion of IQ initiatives within the design and build stage of the acquisition cycle.

2.2.1.2.2. Ensure IQ requirements are captured and refined for inclusion into system architecture designs to ensure they meet operation mission needs.

2.2.1.2.3. Ensure IQ metrics and tools are developed and established for measuring performance against IQ requirements.

2.2.1.3. Ensure design, component, and system performance tests include validation of IQ performance requirements.

2.2.1.4. Advocate and support initialization efforts to ensure delivered system meets operational requirements.

2.2.1.5. Establish stakeholder coordination to ensure 480 ISR WG IQ program initiatives are integrated with current ISR architecture development, sustainment, and IQ programs.

2.2.1.5.1. Coordinate and integrate internal 480 ISR WG program initiatives with external IQ programs.

2.2.1.5.1.1. Align efforts with the EIQVP. EIQVP is responsible for the IQ sustainment of operational assets.

2.2.1.6. Support IQ forums, standing and ad-hoc working groups to assist in the development of TTPs that support IQ sustainment solutions across the AF ISR architecture.

2.2.2. Establish and maintain processes for the sustainment of IQ within the 480 ISR WG. The processes include:

2.2.2.1. Implement training initiatives to educate Wing personnel on sustaining IQ performance and how to identify, troubleshoot, mitigate, and communicate issues. Provide IQ training to the appropriate 480 ISR WG exploitation facility users and maintainers on IQ issues, resolution processes, and IQ program procedures.

2.2.2.1.1. Educate personnel to establish SMEs at each DGS exploitation facility.

2.2.2.1.2. Educate GAs on how to identify, mitigate, and communicate IQ issues that can impact the mission.

2.2.2.1.2.1. Incorporate IQ issues into the appropriate Initial Qualification Training (IQT), Mission Qualification (MQT), and Continuation Training (CT) modules.

2.2.2.1.3. Educate maintenance personnel on how to sustain the IQ performance of DGS exploitation facilities and architecture. Also, train maintainers to troubleshoot and communicate identified IQ performance issues. The EIQVP provides this training on a periodic basis.

2.2.2.1.4. Educate quality control personnel on how to identify, monitor, and assess IQ performance. Also, train quality control personnel to troubleshoot and communicate identified IQ performance issues.

2.2.3. Establish an understanding on the current IQ performance of the ISR enterprise. This process includes:

2.2.3.1. Baseline IQ performance. This provides a reference from which performance can be measured, monitored, and maintained as well as start the IQ sustainment and optimization processes.

2.2.3.2. Document current architecture. In coordination with AF DCGS stakeholders, identify and document the various collection, processing, and dissemination paths imagery takes in reaching the Wing units for exploitation.

2.2.3.3. Measure IQ performance to establish a baseline. Work with AF ISR IQ programs on using metrics and tools to conduct a baseline measurement of architecture performance.

2.2.4. Ensure architecture changes meet or exceed current enterprise performance levels prior to operational implementation.

2.2.4.1. Establish a general IQ test plan and tools to conduct operational testing of new or modified architectures.

2.2.4.1.1. Establish a Standard Image Display Set (SIDS) for each ISR sensor system.

2.2.4.1.2. Develop general operational testing scenario for reviewing IQ with same SIDS data both before and after architecture modification.

2.2.4.1.3. The SIDS and related EEI questions need to encompass a range of IQ performance. This establishes an IQ measurement tool determining the relative performance of a system before or after a modification.

2.2.4.1.4. Formulate EEI questions on the established SIDS that check for various levels of IQ based on the scene content.

2.2.4.1.5. Subjective testing results will be achieved by having a selection of GAs (with preferred 5-Level experience exploiting the data type in question) review the SIDS imagery and answer the EEIs for both before and after implemented architecture changes.

2.2.4.1.6. Objective testing results will be achieved by sending in the before and after SIDS data for quantitative analysis by ISR stakeholders (i.e. EIQVP).

2.2.4.1.7. Send in subjective and objective testing results for analysis.

2.2.4.1.8. Utilize results of the subjective and objective tests to determine if architecture meets or exceeds the operational requirements.

2.2.5. Ensure delivered imagery meets operational requirements. Monitor the quality of imagery disseminated to the Wing. The quality of imagery maintained by the 480 ISR WG is dependent on the IQ received.

2.2.5.1. DGS facilities will review delivered imagery for any IQ issues as part of its GEOINT Exploitation and Dissemination Quality Control (QC) Program Management (AFISRAI 14-121), Airborne Synthetic Aperture Radar (SAR) Imagery Artifacts Resolution Process (AFISRAI 12-122), and/or other equivalent locally employed QC monitoring initiatives.

2.2.6. Establish procedures to sustain the operational capability of the ISR enterprise collection, dissemination, and exploitation architectures.

2.2.6.1. Collection Systems - Support the ISR enterprise efforts to monitor and maintain sensor collection and processing performance.

2.2.6.1.1. DGS facilities will periodically, and upon ad-hoc request, deliver mission data as required by EIQVP for analysis and monitoring of airborne collection and distribution quality. 480 ISRW will generate a monthly tasker outlining specific requirements for delivery and installation.

2.2.6.2. Dissemination Systems - Support and conduct efforts to monitor dissemination system performance.

2.2.6.2.1. DGS sites will conduct periodic subjective review of SIDS test imagery to monitor dissemination system performance.

2.2.6.2.2. On-site maintenance personnel, the IQPM, or quality control personnel will conduct SIDS evaluations. Using SIDS, side-by-side comparisons can be made on softcopy exploitation workstations to determine if there is a problem with the

transmission or the processing of the data. This evaluation checks for anomalies introduced by the system and not by the sensor.

2.2.6.2.3. DGS facilities will submit downloaded SIDS data, as part of the monthly mission data delivery submission to EIQVP for objective IQ analysis.

2.2.6.3. Exploitation Systems - DGS facility personnel will maintain and monitor exploitation workstations and facilities. In order to sustain the IQ performance of exploitation systems, the performance should be maintained and performance levels monitored in-between maintenance activities. This will ensure the systems continue to meet the mission requirements while optimizing the Human Visual System (HVS) interface to IQ standards. DGS facility will maintain and monitor the exploitation facility environment, image processing software on exploitation workstations, and softcopy display performance.

2.2.6.3.1. Design and maintain softcopy exploitation facilities in accordance with guidance provide by EIQVP, NGA's *Softcopy Facility Guidelines* document, and NGA's *Softcopy Exploitation Facility Standard* see Chapter 3 Section 3.2.1 for most up-to-date version and specifications as of this writing.

2.2.6.3.2. Maintain exploitation displays by monitoring and periodically calibrating displays to maintain the performance standards outlined by EIQVP and NGA's most up-to-date *Display Performance Standard* see Chapter 3 Section 3.2.2 for most up to date version and specifications of this writing.

2.2.6.3.2.1. On the 5th duty day of each month, email **caldata@exelisinc.com** the CALTOOL display maintenance database for EIQVP review.

2.2.6.3.3. Monitor and maintain exploitation workstation performance using the information collected in the CALTOOL database during the monthly calibration process. This software plots the performance trends of displays over time and can be used to identify monitors reaching end of life. In submitting this data to EIQVP, as indicated in section 2.2.6.3.3.1, they can be contacted to assist in interpreting the tracking and trending data.

2.2.6.3.3.1. Ensure image processing software on exploitation workstations complies with NGA's *Softcopy Image Processing Standard* and EIQVP guidance on proper software settings and processing methodologies see References Section for most up to date version as of this writing].

2.2.7. Establish processes for communicating IQ performance status and related performance issues.

2.2.7.1. The status of system maintenance and performance is collected by the local DGS site. This information is then relayed, as needed, to Wing and IQ program stakeholders. Identified issues that cannot be addressed locally are communicated to ISR enterprise stakeholders through mechanisms such as DRs and community forums.   The 480 ISR WG IQPD tracks and validates the investigation and resolution of captured DRs. Items that cannot be addressed in the current architecture are captured and input as requirements (i.e. AF Form 1067s) for development systems.

2.2.7.2. Establish a process for capturing and addressing IQ issues. Through the use of discrepancy reports, any user-identified IQ issues will be collected and addressed as part of a process that identifies, assesses, and resolves IQ issues.

2.2.7.3. Establish a DR and resolution tracking process. The DR process provides users the ability to report IQ issues with respect to architecture performance. Identified deficiencies that cannot be corrected in the current architecture will be submitted as candidates for new system requirements.

2.2.7.4. Develop a response process in order to effectively troubleshoot the nature of the issue and identify the correct organization for remediation.

Chapter 3

REQUIREMENTS, STANDARDS, AND SUPPORT EQUIPMENT

3.1. In order to ensure end-to-end IQ throughout the image chain, IQ initiatives must be included in the entire design, build, and operational life cycle of the ISR Enterprise. Therefore, IQ requirements must be included in each of the various life cycle stages. This operating instruction references how 480 ISR WG personnel interact with these Enterprise life cycle IQ initiatives. They are consolidated below and referenced in other portions of the document where they are applicable and to be enforced. When referencing the below documentation in support of this OI, personnel should verify if updated documentation exists and if so follow the requirements outlined in that new documentation. New specifications in updated document versions will immediately supersede any specific requirements documented in this OI.

3.2. IQ requirements will be maintained in accordance with the following standards, requirements, and guidelines:

3.2.1. Ensure exploitation facility environment is designed and sustained to IQ standards IAW with NGA's standardization document *Softcopy Exploitation Facility Standard* and NGA's *Softcopy Facility Guidelines* document.

3.2.1.1. Ensure diffuse light normal to the softcopy display is ≤ 2.0 foot candle (fc).

3.2.1.1.1. Ensure no glare is evident on the exploitation workstation display.

3.2.1.1.2. Ensure diffuse light normal to the keyboard is ≥ 0.5 fc but ≤ 2.0 fc.

3.2.1.1.3. Ensure diffuse light normal to the background is ≥ 0.5 fc but ≤ 6.7 fc.

3.2.1.2. Utilize NGA's *Softcopy Facility Guidelines* document to design and modify facilities to comply with exploitation facilities lighting standards.

3.2.1.3. In order to comply with these standards the site will obtain and maintain the following equipment for measuring ambient light levels.

3.2.1.3.1. Obtain photometer for verifying exploitation facility lighting specifications. An example unit would be the Minolta IV Flash Meter.

3.2.1.3.2. Photometer should be sent in for periodic calibration as specified by the local Precision Measurement Equipment Laboratory (PMEL).

3.2.2. Ensure exploitation displays are procured and sustained to IQ standards as outlined in NGA's standardization document *Display Performance Standard.* The current version as of this writing is referenced below. This is achieved by monitoring and calibrating displays monthly (requirement provided, and can be modified by WR-ALC/HBGB's EIQVP and is current as of this writing). Group/CC is the waiver authority with respect to meeting exploitation display calibration requirements. Background, justification, and get well plan for waiver should be forwarded to 480 ISR WG/DOO and 480 ISR WG IQPD.

3.2.2.1. NGA.STND.0015_3.1: *Display Performance Standard,* (2010-07-13) version 3.1, details in section 2.1.2.1, *Display Performance Specifications Summary Tables* that Color LCD displays should meet the following specifications to meet calibration requirements:

3.2.2.1.1. Maximum luminance setting for a color LCD will be 40.0 fL -10% to +25% (36 fL to 50 fL).

3.2.2.1.2. Minimum luminance setting for a color LCD will be 0.1 fL -30% to +130% . Recommend aiming for .15 +/- .01 fL within this range.

3.2.2.1.3. Color temperature will be set to 6500K ±2.5 C*ab for maximum luminance and have a color tracking that is no greater than 5 C*ab.

3.2.2.2. In order to comply with these standards the site will obtain and maintain the following equipment for measuring ambient light levels:

3.2.2.2.1. Obtain CALTOOL supported colorimeter equipment for calibrating the exploitation displays. A colorimeter can be obtained from WR-ALC/HBGB via the AF inventory system, As of this writing, CALTOOL is the display calibration software installed in the DCGS weapon system and the Yokogawa Model #3298-F is the supported colorimeter.

3.2.2.2.2. Colorimeter should be sent in for periodic calibration as specified by the local PMEL, colorimeter manufacturer, or WR-ALC/HBGB EIQVP guidance.

3.2.3. Ensure compliance with HHQ Guidance with respect to periodically submitting mission data for sensor and distribution IQ performance monitoring. This requires complying with the latest mission data submission requirements established by WR-ALC/HBGB's EIQVP. The 480 ISRW/DOO will generate a tasker for GPs with specific requirements and delivery instructions.

3.2.3.1. ASARS requirement - Gather two missions per month per sensor kit, preferably collected in two week intervals. Send all missions in one shipment per month to EIQVP.

3.2.3.2. SYERS requirement - Gather one mission, per month, per sensor kit. Send all missions in one shipment per quarter to EIQVP.

JEFFREY A. KRUSE, Colonel, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 14-1, *Intelligence, Surveillance, and Reconnaissance (ISR) Planning, Resources, and Operation,* 2 April 2004

AFISRAI 14-121, *Geospatial Intelligence Exploitation and Dissemination Quality Control (QC) Program Management,* 30 October 2009

AFISRAI 14-122, *Airborne Synthetic Aperture Radar (SAR) Imagery Artifacts Resolution,* 31 August 2010

NGA.STND.0014_2.2: *Softcopy Image Processing Standard, (*2010-07-13) version 2.2

NGA.STND.0015_3.1: *Display Performance Standard,* (2010-07-13) version 3.1

NGA.STND.0016_2.0: *Softcopy Exploitation Facility Standard, (*2010-07-13) version 2.0

NGA's *Softcopy Facility Guidelines* document (21 December, 2006) v2.1

Adopted Form

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AF DCGS—Air Force Distributed Common Ground System

AFISRA—Air Force Intelligence Surveillance and Reconnaissance Agency

ASARS—Advanced Synthetic Aperture Reconnaissance System

CALTOOL—Calibration Tool

CT—Continuation Training

DR—Discrepancy Report

EEI—Essential Elements of Information

EMI—Electro-Magnetic Interface

EIQVP—Enterprise Image Quality Verification Program

GA—Geospatial Analyst

HHQ—Higher Headquarter

HVS—Human Visual System

IQ—Image Quality

IQPD—Image Quality Program Director

IQPM—Image Quality Program Monitor

ISR—Intelligence, Surveillance, and Reconnaissance

IQT—Initial Qualification Training

LCD—Liquid Crystal Display

MOC—Mission Operations Commander

MQT—Mission Qualification Training

NGA—National Geospatial-Intelligence Agency

PMEL—Precision Measurement Equipment Laboratory

PMI—Preventative Maintenance Initiatives

PMS—Post Mission Summary

QC—Quality Control

SAR—Synthetic Aperture Radar

SIDS—Standard Image Data Set

SME—Subject Matter Expert

SYERS—Senior Year Electro-Optical Reconnaissance System

TTP—Tactics, Techniques, and Procedures

UNICORN—Unified Collection Operation Reporting Network

Terms

Artifact/Anomaly—There is a fine line in discerning the terms image artifact and anomaly. They both describe unexpected observations within an image. The term used is impacted by the root cause of that unexpected observation. "AFISRAI 14-122 *Airborne SAR Imagery Artifact Resolution Process"* refers to SAR image "artifacts" as being related to phenomenology, collection conditions, and external Electro- Magnetic Interference (EMI) while "anomalies" refer to issues caused be image architecture performance. Often when an IQ issue is initially observed the cause is not known. Therefore, it is common for the term artifact or anomaly to be used interchangeably when referencing an unexpected output observed within an image. Below is more in-depth description of each term.

Dissemination—In this instruction, dissemination refers to the distribution of images across any portion of the imaging architecture. For example, an image is collected by a sensor (Collection) and then disseminated across the architecture (Dissemination) to a user who then exploits the image (Exploitation).

Human Visual System (HVS)—Sensory system in which the eye and visual cortex collect and process light to provide a mental image.

Image Quality— In the case of reconnaissance, it is a matter of how accurately the imaging architecture can capture and convey spatial and tonal (to include spectral) ground truth information so it can be exploited by an analyst. Image quality is ultimately a subjective judgment by the human observer as to how well that image visually conveys scene content. It is a characteristic of an image that measures the perceived image degradation (typically, compared to an ideal or perfect image).

Intelligence, Surveillance, and Reconnaissance (ISR) Stakeholders—Refers to anyone who has a vested interest in the performance of imagery generated and/or distributed on the AF ISR

imaging architectures. Includes organizations and personnel who acquire, deliver, sustain, and operate that architecture as well as those who exploit and consume imagery and products from that architecture.

Tap Point—A designated data collection node along a system's imagery chain where imagery is processed exploited and/or changes mediums for distribution.

Standard Image Data Set (SIDS)—Is a reference set of imagery with known quality parameters that can be used to test an imaging path. The SIDS test suite is ideally made up of a variety of images representative of a particular sensors output but that also represent stress cases for the capabilities of that imaging system. These set of test images can then be inserted into the front end of an imaging chain and then can be sampled at various tap point in the imaging architecture. The input and output test image can then be compared to determine the presence and degree of any IQ losses. A SIDS set needs to be unique to each sensor type (i.e. EO, IR, SAR, etc).