



NIQU Overview: NSG PQ Assurance

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Lead

NGA Image Quality and Utility
(NGA/AEIQ)

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Agenda

- NGA Image Quality Utility (NIQU) Overview
- NIQU Capabilities & Tools
- Integration of CCAP
- Current/Recent Commercial Imagery Efforts



(U) NGA Image Quality and Utility (NIQU)



NIQU Mission

“Assure the quality of **all** GEOINT products through **vigorous** participation in both *development lifecycle* of NSG segments and the operations cycle of day to day exploitation”



NIQU Vision

NSG analysts must be able to
Discover, Retrieve and Exploit
GEOINT data from any
National, Commercial or Tactical source
to produce
Timely, Accurate and Relevant
geospatial-intelligence products



What is the NSG?

- The National System for Geospatial Intelligence (**NSG**) is the combination of technology, policies, capabilities, doctrine, activities, people, and communities necessary to produce geospatial intelligence in an integrated multi-intelligence, multi-domain environment.
- The NSG includes the Intelligence Community, the Joint Staff, the Military Departments (to include the Services), the Combatant Commands, international partners, Civil Applications Committee members, industry, academia, Defense service providers, and civil community service providers.





PQA Policy Guidance

- **NIQU is Functional Manager of Image Quality for the NSG**
 - Director NGA/Acquisition
- NIQU maintains & updates a set of Product Quality Operational Criteria for every sensor type used by the NSG
- NSG Performance Requirements
 - Key Performance Parameters (KPPs) are those capabilities or characteristics considered most essential for successful mission accomplishment. Failure to meet an NSG KPP Threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated.

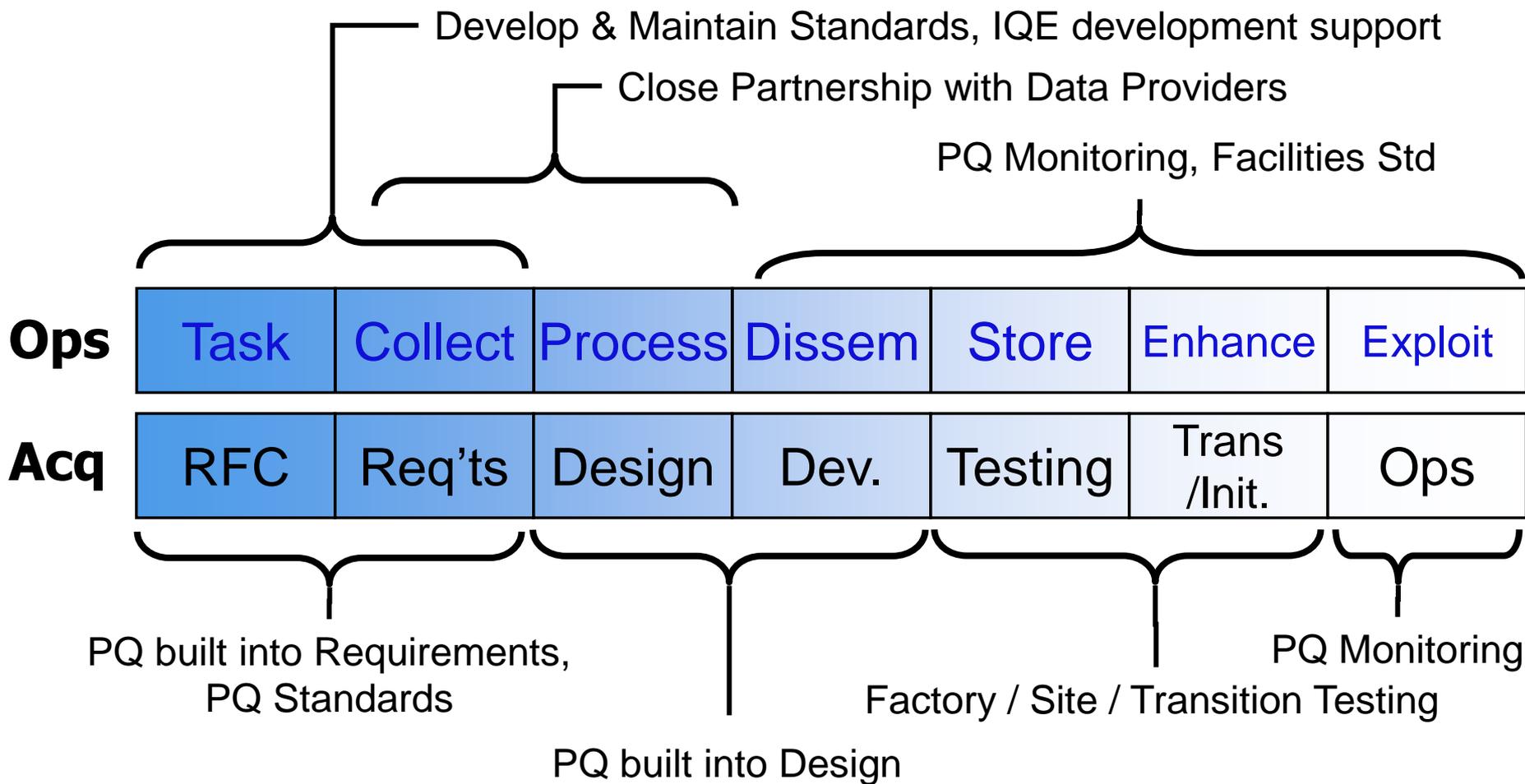


PQA Policy Guidance

- NSG Performance Requirements:
 - KPP-1: Interoperability
 - The **FUNCTIONALITY** of products **MUST** be correct in NSG tools
 - KPP-2: High Priority Timeliness
 - KPP-3: Image/Data Quality
 - The **INTERPRETABILITY** of products **MUST NOT** be degraded by NSG
 - KPP-4: Data Integrity
 - The **ACCURACY** of products **MUST NOT** be degraded by NSG
 - KPP-5: Exploitation Capacity
 - KPP-6: Foundation Data Production
 - KPP-7: Mission Specific Data Production
 - KPP-8: TPED Operational Availability



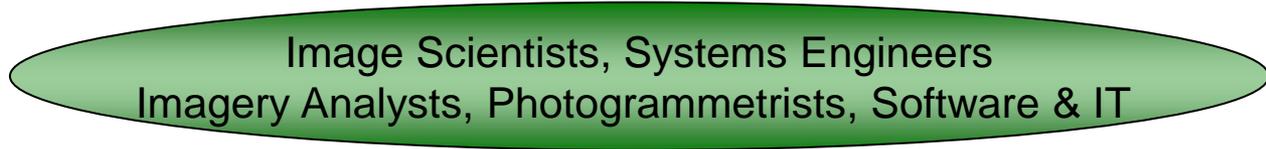
Where Does NIQU Participate?





NIQU Components

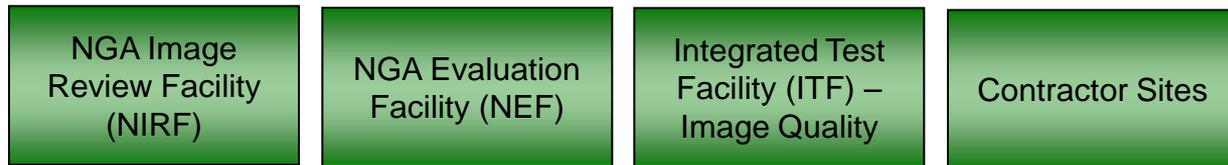
PEOPLE



AREAS



FACILITIES



TOOLS



HARDWARE





NIQU Capabilities Overview



Key NIQU Activities

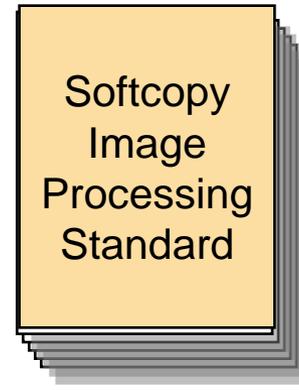
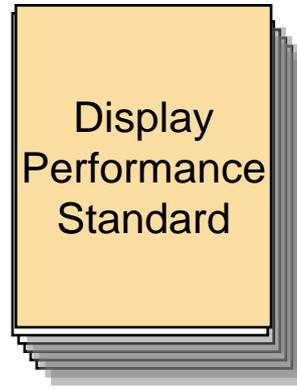
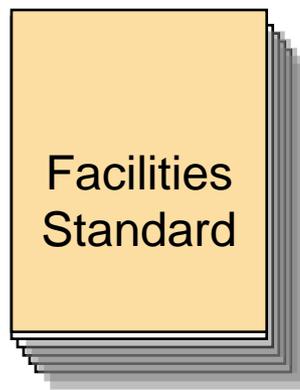
- Product Quality (PQ) Standards
- Sensor Performance Verification
- Tool Verification
- System Update Verification
- Operational PQ Monitoring



Product Quality Standards



- Standards are the basis by which NIQU establishes consistency and accuracy within the NSG
 - Where they exist we verify and update them
 - Where they're missing, we create them





Sensor Performance Verification

- NIQU participates in bringing new capabilities online by verifying the performance of the new products against the Product Quality Operational Criteria
 - NTM, Commercial, and some airborne programs
- Are these new products interoperable within the NSG?
- Is the geopositioning accuracy as advertised?



Tool Verification

- NIQU often gets asked to assess the usability and interoperability of new tools
 - Automated search tools, Google-Earth-like applications, terrain categorization tools
- Our on-site imagery analysts are able to quickly assess the usability of these tools with a user perspective



System Update Verification

- The NSG is constantly improving
- NIQU participates in all NSG updates which contain a risk to PQ
 - Requirements reviews
 - Design consultation
 - Acceptance testing
 - Operational readiness recommendation

Operational PQ Monitoring

- NIQU collects PQ metrics on many sensors being ingested into the NSG
 - Edge Response, Noise, SNR
- The metrics are compiled into a monthly report
 - Current PQ trends and issues
 - Historical performance

EO: Pan, MSI, IR
RF: SAR
etc.

Measurements and Statistics

Tracking and Trending of Metrics
Noise, RER, Resolution, etc.

NIQU Monthly Quality Report



Integration of Civil and Commercial Application Project (CCAP) into NIQU



Integration of NGA Civil and Commercial Applications Project (CCAP) into NIQU

- The NGA Civil and Commercial Applications Project (CCAP) was integrated into NIQU in November 2008
- The inherited CCAP Contractor skill-set included the following:
 - 2 Photogrammetric Engineers
 - 1 Spectral Image Scientist
 - 1 Imagery Analyst
 - 1 Geospatial Analyst
- Current NIQU CCAP skill-set configuration:
 - 3 Photogrammetric Engineers
 - 1 Spectral Image Scientist
 - 1 Radar Image Scientist (TBD)



What expertise has CCAP brought to NIQU?

- Absolute Geo-location Accuracy Evaluation
- Investigation of Geo-location metadata issues
- Ground Sampled Distance Evaluation
- Stereo Collection Angle Evaluation
- Pan-MSI and MSI band-to-band geo-location accuracy
- GeoSAR DEM accuracy
- Investigation of Cloud cover metadata issues
- Radiometric Accuracy Evaluation



NIQU CCAP Assessment Activity

- Recent NIQU CCAP Assessment Activity:
 - WorldView-1
 - WorldView-2 (ongoing)
 - GeoEye-1
 - EROS-B
 - Radarsat-2
 - ActiveEarthscape Orthos
 - RapidEye
 - Cosmo-Skymed
 - TerraSAR-X
- Past NIQU CCAP Assessment Activity
 - QuickBird-2
 - OrbView-3
 - SPOT-5
 - EROS-A
 - GeoSAR DEMs



NIQU Commercial Projects

- U.S. Commercial System Transition
 - WorldView-1 Transition completed in January 2008
 - GeoEye-1 Transition completed in June 2009
 - WorldView-2 Transition – Ongoing
 - NIQU and CCAP assessment activity merged during GeoEye-1 transition
- Quick-look PQ assessments for U.S. Commercial Data Provider processing SW/HW upgrades
- NSG Segment Commercial Imagery Integration
 - Information Dissemination Services – Direct Delivery (IDS-D)
 - National Geospatial-Intelligence Library (NGL)
 - Integrated Exploitation Capability (IEC)



NIQU Points of Contact: Commercial

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