# Global Command and Control System – Joint (GCCS-J)

Executive Summary

- In FY16, the Defense Information Systems Agency's (DISA) development of Global Command and Control System – Joint (GCCS-J) focused on three elements of the system: Global v6.0, Agile Client Release 7 v5.1.0.1, and Joint Operation Planning and Execution System (JOPES) v4.2.0.4.
  - Global v6.0 and Agile Client Release 7 v5.1.0.1 represent the first phase of development to replace the full capabilities of the currently fielded Global v4.3 Update 1 Emergency Release 1.
  - JOPES v4.2.0.4 supports migration to 64-bit applications, Public Key Infrastructure implementation on web servers, and security enhancements.

Global

- The Joint Interoperability Test Command (JITC) conducted a Cooperative Vulnerability and Penetration Assessment (CVPA) and Adversarial Assessment (AA) on Global v4.3 Update 1 Emergency Release 1 at U.S. Pacific Command (USPACOM), Camp H.M. Smith, Hawaii, from December 2015 through January 2016. During this CVPA and AA, JITC verified and assisted in the correction and mitigation of vulnerabilities discovered during previous assessments and improved the system's cybersecurity posture as deployed at USPACOM Headquarters. However, GCCS-J remains vulnerable to cyber exploitation by an adversary with limited-to-moderate cyber capabilities.
- JITC conducted the Global v6.0 and Agile Client Release 7 v5.1.0.1 operational assessment (OA) at U.S. Central Command, MacDill AFB, Florida, and U.S. Strategic Command, Offutt AFB, Nebraska, from August 2 – 9, 2016.
- JITC evaluated 18 of 22 capability areas delivered in this initial Global v6.0 and Agile Client Release 7 v5.1.0.1. Users successfully completed the majority of mission tasks in all delivered capability areas. However, users identified significant defects in six capability areas.
- Global v6.0 and Agile Client Release 7 v5.1.0.1 are not suitable for all users. More than half of Global users (6 of 11) believe these systems cannot support real-world combat operations due to performance problems and capability gaps. The remaining users indicated that the systems need updates to be suitable.
- JITC will conduct an AA, once the program manager fields Global v6.0 and Agile Client Release 7 v5.1.0.1.
- DOT&E will evaluate Global v6.0 and Agile Client Release 7 v5.1.0.1 effectiveness and suitability, once the program manager delivers a more complete set of capabilities. The OA was adequate to evaluate initial system capabilities.
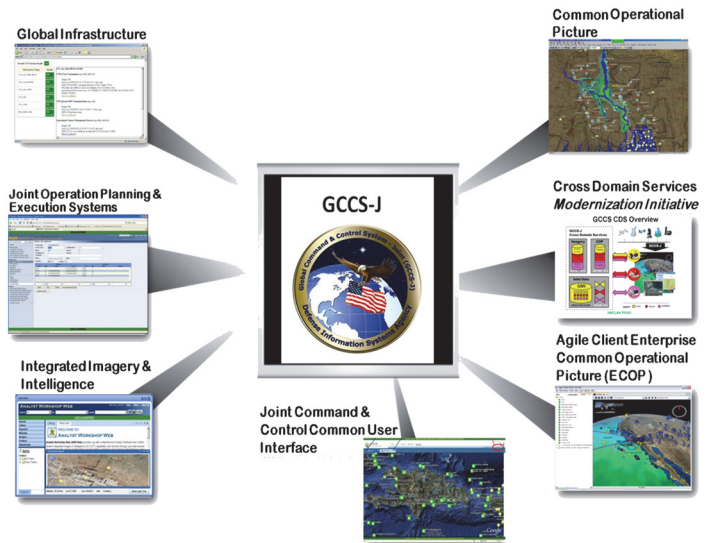
JOPES

- JITC conducted the JOPES v4.2.0.4 operational test from September 28 through October 14, 2016.
- JOPES v4.2.0.4 is operationally effective for all Services except the Air Force. JOPES v4.2.0.4 users successfully created operational plans and force requirements; sourced, updated, and validated force requirements; and completed scheduling and movement of forces. Air Force Deliberate and Crisis Action Planning and Execution Segments (DCAPES) users were unable to source Combatant Command force requirements due to a JOPES v4.2.0.4 to DCAPES interface defect. All other Service Force Providers and JOPES users were able to successfully source force requirements.
- JOPES v4.2.0.4 is operationally suitable. Users found JOPES v4.2.0.4 performance and usability comparable to the currently fielded version. JOPES v4.2.0.4 met the availability threshold of 99.7 percent.
- JOPES v4.2.0.4 survivability is undetermined. JITC initiated the JOPES v4.2.0.4 CVPA in April 2015, but the discovery of system defects prevented completion. JITC plans to complete the CVPA and conduct an AA on the fielded version of JOPES v4.2.0.4.

System

- GCCS-J consists of hardware, software (both commercial off-the-shelf and government off-the-shelf), procedures, standards, and interfaces that provide an integrated, near real-time picture of the battlespace that is necessary

to conduct joint and multi-national operations. Its client/ server architecture uses open systems standards and government-developed military planning software. Global and JOPES are two of the baseline systems that comprise the operational environment of GCCS-J.

Global (Force Protection, Situational Awareness, and Intelligence applications)

- Global v4.3 Update 1 Emergency Release 1 is the currently fielded version. DISA developed Global v4.3 Update 1 to implement high-priority intelligence mission updates to the Theater Ballistic Missile correlation systems, Joint Targeting Toolbox, and Modernized Integrated Database. Emergency Release 1 resolved an operational deficiency discovered in the fielded Global v4.3 Update 1 software and included some of the improvements originally planned for the canceled Global v5.0.
- Global v6.0 and Agile Client Release 7 v5.1.0.1 represent the first phase of a development plan to replace the full capabilities of Global v4.3 Update 1 Emergency Release 1. Global v6.0 will provide back-end services, databases, and system administration functions. Agile Client Release 7 v5.1.0.1 (Agile Client core services and the Agile Client plug-in) provides visualization and presentation of GCCS-J mission applications and functionality to the user.

JOPES (Force Employment, Projection, Planning, and Deployment/Redeployment applications)

- JOPES v4.2.0.3 Emergency Release 4 is the currently fielded version. DISA developed JOPES v4.2.0.3 Emergency Release 4 to implement Global Force Management capabilities. This release added Force Tracking Number and Deployment Order information to the system, as well as an ability to identify and query operationally relevant plans. DISA also corrected seven critical deficiencies.
- JOPES v4.2.0.4 supports migration to 64-bit applications, Public Key Infrastructure implementation on web servers, security enhancements, and resolves 25 problem reports. While this release does not introduce new user capabilities, the changes affect all critical mission areas and external interfaces.

Mission
- Joint Commanders utilize the GCCS-J to accomplish command and control.
  Global
  - Commanders use Global to:
    - Link the National Command Authority to the Joint Task Force, Component Commanders, and Service-unique systems at lower levels of command
    - Process, correlate, and display geographic track information integrated with available intelligence and environmental information to provide the user a fused battlespace picture
    - Provide Integrated Imagery and Intelligence capabilities (e.g., battlespace views and other relevant intelligence) into the common operational picture and allow commanders to manage and produce target data using the Joint Tactical Terminal
    - Provide a missile warning and tracking capability
  - Air Operations Centers use Global to:
    - Build the air picture portion of the common operational picture and maintain its accuracy
    - Correlate or merge raw track data from multiple sources
    - Associate raw Electronics Intelligence data with track data
    - Perform targeting operations
  JOPES
  - Commanders use JOPES to:
    - Translate policy decisions into operations plans that meet U.S. requirements to employ military forces
    - Support force deployment, redeployment, retrograde, and re-posturing
    - Conduct contingency and crisis action planning

Major Contractors
- Government Integrator: DISA
- Software Developers:
  - Northrop Grumman – Arlington, Virginia
  - Leidos – Arlington, Virginia
  - Pragmatics – Arlington, Virginia

Activity
  Global
  - JITC conducted a CVPA and AA on GCCS-J v4.3 Update 1 Emergency Release 1 at USPACOM, Camp H.M. Smith, Hawaii, from December 2015 through January 2016.
  - JITC conducted the Global v6.0 and Agile Client Release 7 v5.1.0.1 OA at U.S. Central Command, MacDill AFB, Florida, and U.S. Strategic Command, Offutt AFB, Nebraska, from August 2 – 9, 2016, in accordance with a DOT&E-approved policy that did not require a DOT&E-approved test plan.

  JOPES
  - JITC conducted the JOPES v4.2.0.4 operational test from September 28 through October 14, 2016, in accordance with a DOT&E-approved policy that did not require a DOT&E-approved test plan. U.S. Africa Command, Kelly Barracks, Germany; U.S. European Command, Patch Barracks, Germany; USPACOM, Camp H.M. Smith, Hawaii; Combatant Command components; and Force Providers participated in the operational test.

Assessment

Global

- During the Global v4.3 Update 1 Emergency Release 1 CVPA and AA, JITC verified and assisted in the correction and mitigation of vulnerabilities discovered during previous assessments and improved the system's cybersecurity posture as deployed at USPACOM Headquarters. However, GCCS-J remains vulnerable to cyber exploitation by an adversary with limited-to-moderate cyber capabilities.

- JITC evaluated 18 of 22 capability areas delivered in this initial Global v6.0 and Agile Client Release 7 v5.1.0.1. Users successfully completed the majority of mission tasks in all delivered capability areas. However, users identified significant defects affecting six capability areas:

  - Manage Common Operational Picture. Poor Agile Client Release 7 v5.1.0.1 performance under an operationally realistic track load restricts Combatant Command situational awareness. Users experienced Agile Client Release 7 v5.1.0.1 freezes, requiring a manual restart, under an operationally realistic track load (55,000 tracks). To complete testing, users applied database filters on the Global v6.0 server to limit tracks sent to Agile Client (less than 10,000 tracks). With filters applied, Agile Client performance was acceptable, and users successfully completed mission tasks.

  - Manage Track Data. Users lost previously created bookmarks, plug-in downloads, and filter templates due to Agile Client Release 7 v5.1.0.1 freezes and experienced excessive downtime regaining access or recreating them.

  - Manage Intelligence Data. Users could not associate an image to a joint desired point of impact target in Global v6.0, which could lead to an analyst associating the wrong image or coordinates for a mission folder.

  - Support Battle Damage Assessment. Users were unable to delete associations between targets and target records in Global v6.0. To maintain target record accuracy, users regularly refine intelligence data and break associations with out of date records.

  - Support Missile Defense. Users were unable to view raw data reports for missile tracks because Global v6.0 does not interface with the Integrated Broadcast System. Global v6.0 currently receives missile reports using the Common Operational Picture Synchronization Tools interface. Users rely on these reports in the currently fielded Global v4.3 Update 1.

  - Reconstruct Historical Events. The Agile Client Release 7 v5.1.0.1 does not have the ability to record missile events as they occur or replay them as needed. Users rely on this capability in the currently fielded Global v4.3 Update 1.

- Global v6.0 and Agile Client Release 7 v5.1.0.1 are not suitable for all users. More than half of Global users (6 of 11) believe the systems cannot support real-world combat operations due to performance problems and capability gaps. The remaining users indicated that the systems need updates to be suitable.

- Users felt Global v6.0 and Release 7 v5.1.0.1 online training did not provide necessary knowledge to conduct mission tasks.

- JITC will conduct an AA once the program manager fields Global v6.0 and Agile Client Release 7 v5.1.0.1.

- DOT&E will evaluate Global v6.0 and Agile Client Release 7 v5.1.0.1 effectiveness and suitability once the program manager delivers a more complete set of capabilities. The OA was adequate to evaluate initial system capabilities.

JOPES

- JOPES v4.2.0.4 is operationally effective for all Services except the Air Force. JOPES v4.2.0.4 users successfully created operational plans and force requirements; sourced, updated, and validated force requirements; and completed scheduling and movement of forces. Air Force DCAPES users were unable to source Combatant Command force requirements due to a JOPES v4.2.0.4 to DCAPES interface defect. The interface defect significantly affects the Air Force, which relies on DCAPES for sourcing force requirements. All other Service Force Providers and JOPES users were able to successfully source force requirements.

- JOPES v4.2.0.4 is operationally suitable. Users found JOPES v4.2.0.4 performance and usability comparable to the currently fielded version. JOPES v4.2.0.4 met the availability threshold of 99.7 percent. System administrators successfully installed and configured the system using the available documentation.

- JOPES v4.2.0.4 survivability is undetermined. JITC initiated the JOPES v4.2.0.4 CVPA in April 2015, but the discovery of system defects prevented completion. JITC plans to complete the CVPA and conduct an AA on the fielded version of JOPES v4.2.0.4.

Recommendations

- Status of Previous Recommendations. DISA has addressed one of the two previous FY15 recommendations. However, DISA still needs to conduct cybersecurity testing of JOPES v4.2.0.3 Emergency Release 4 (or later) in an operational environment to assess protect, detect, react, and restore capabilities.

- FY16 Recommendations. DISA should:
  1. Develop and field mitigations for the discovered vulnerabilities to all Global v4.3 Update 1 Emergency Release 1 locations and verify that the vulnerabilities have been corrected.
  2. Correct Global v6.0 and Agile Client Release 7 v5.1.0.1 deficiencies discovered during the OA.
  3. Correct the DCAPES interface defect and conduct regression testing prior to fielding JOPES v4.2.0.4.
  4. Conduct an AA on the fielded versions of Global v6.0 and Agile Client Release 7 v5.1.0.1.
  5. Complete the CVPA and conduct an AA on the fielded version of JOPES v4.2.0.2.