Consolidation of Ground Control Stations for ISR Systems

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Ground Control Station Definition

Ground stations typically represent a collection of information technology systems, computing resources, displays, networking and communication systems and controls necessary to support:

- Command and control of the platform and its payloads including its weapon systems, communications systems and sensors
- Processing of sensor data and telemetry to create products that enable situational awareness, support intelligence, force protection and other warfighter functions
- Display sensor data, telemetry and other information provided by the sensor platform
- Store sensor data, telemetry and derived products and enable discovery and dissemination of that data to external users
- Interface with external sensors to enable sensor data fusion, cueing and other collaborative functions
- Enable real-time communications between operators at the ground station and external users for command and control and real-time dissemination of information derived from the sensor collections (e.g., chat, VOIP and radio communications)
From ISR Portfolio Review to VCSA (2 Mar 10)

Layered RSTA

No more “stovepipes”
ISR Modernization

**Data Enterprise (Brain – Cloud)**

**POR Migration & Modernization**

**Consolidated Components**

**USF across DCGS-A Portfolio**

**Enhanced Capability to the Force**

**FY06-09**
- JIOC-1
- ASAS ACE
- ASAS ACT-E
- DTSS-L
- CGS
- DTES
- IWS
- PROPHET Control
- TES-F
- GR IPF
- DCGS-A Fixed Site
- ASAS IFS
- ASAS-L
- CI&I Ops
- DCGS-A(V)3 (DE ASAS)

**FY10-11**
- DE-ACE
- DE-CGS
- DE-DTSS-L (TWSO)
- TES-F
- PROPHET Control
- DCGS-A Mobile Basic

**FY12-17**
- GGB
- DIG-B
- DIG-A
- DIG-E
- DIG-D

**Reduction of footprint over the years**

**DIG: DCGS-A Integration Group – a single or group of DCGS-A Enabled (DE) POR systems that provide enhanced capability until full deployment of Mobile Basic systems**

**Continue Collapse of PORs to Common Software Framework**
Share, Manage, and Provide Critical Situation Awareness Data/Product at All Echelons and All Networks
Force Protection

- BETSS-C migrating to Standard Ground Station
  - Reduce training costs
  - Efficient management: upgrades benefit all systems
  - Path forward to open architecture and greater competition

- Interoperability with DCGS-A
  - Demonstrated during testing at YPG and EC 2010
EMARSS Operational View
CF-UGS Comm Architecture

Ground Station

Network Operations Center
DoD SATCOM

Iridium SATCOM

Military Intelligence

Man-in-the-Loop

OIF

OEF
From PEO Missiles & Space
SMDC Nano-Satellite Initiatives

SMDC-Operational Nano-Satellite Effect
- Data Exfil / Over-The-Horizon Comms
- 4kg Mass Cube-sat
- 8 Flight-Ready Satellites
- First Launch 8 December 2010

Kestrel Eye
- 15kg Mass
- 1.5m Imagery Resolution
- Tasked from Theater
- Launch ready Fall 2011

Multipurpose Nano-Missile System (MNMS)
- Low-Cost Launch Capability
- Augmentable with ATACMS / MLRS Motors
- Target Vehicle, Sensor Testing
- Responsive Nano-sat Orbital Launch
- Innovative yet Simple Design Approach
- 60 second 1st Stage Test 18 June 2010

Small Agile Tactical Satellite

Nano-Eye

SMDC-Tech-Sat
SMDC-ONE Mission Description

- Satellite-Autonomous Data Collection from Unmanned Ground Sensor
  - Mission Executed From Stored Scheduler or Ground station operating in C2 mode uplinks instructions “1” Based on Time Schedule
  - Satellite Polls second ground station operating in GS mode for pre-Loaded data “2” and Retrieves Data
  - Satellite Data Collection from second ground station “3”
  - Collected Data Transferred to Ground station operating in C2 mode “4”

\[ \text{Satellite} \rightarrow \text{Ground Station 1} \leftarrow \text{Ground Station 2} \rightarrow \text{Ground Station 3} \rightarrow \text{Ground Station 4} \]

\[ \text{C2 Ground Terminal} \rightarrow \text{UGS} \]
- Launched piggyback on another mission
- Weight: <9lbs
- Cost: <$300K per satellite
- Potential SMDC-ONE missions:
  - Beyond-Line-of-Sight comms
  - Text, voice, images at low data rate
  - Unattended Ground Sensor data exfiltration
  - Blue Force Tracking
  - Tag and Track
- Small footprint ground station
  - One laptop, comm box, man-portable antenna
- Success so far:
  - Regular contacts and ops
  - Text and images relayed across 1200 miles
- Where to now?
  - SMDC-ONES could provide low data rate comm to remote dismounted users across Afghanistan
  - 18 months to deliver capability
SMDC-ONE Accomplishments

• Obtained solicited data from the satellite at the Huntsville ground station on the satellite's first revolution
• Transferred data files between Colorado Springs & Huntsville ground stations
• Consistently obtained state-of-health data from the nanosatellite
• Transferred files between Colorado Springs & Huntsville included text to/from SMDC/ARSTRAT Commander LTG Formica, jpegs (images), & simulated ground sensor data

• Obtained megabytes of sensor & mission data from the satellite over a month
• Performed actual data exfiltration of military unattended ground sensors on Redstone Arsenal demonstrating capability of adding technical demonstration to the testing well after satellite was delivered for launch & even after launch
• All ground operations handled by on-site Army team
UGS CONOPS Example