The SHARC (Squadron hi-vis Advanced Reconnaissance Computer) is a state-of-the-art portable ground station for the rapid screening of Advanced Tactical Air Reconnaissance System (ATARS) visible, infrared, and radar imagery data. The SHARC can receive and process data from a solid-state recorder (SSR), DVD, CD, tape, and hard drive. It provides a STANAG 4575 compliant interface to the ATARS SSR—the BAE Removable Memory Module (RMM). The SHARC was developed as a F/A-18 squadron-level asset to screen ATARS data, but can be customized to support data from multiple sensor formats, including other single- and multi-band electro-optical/infrared (EO/IR), synthetic aperture radar (SAR), and hyperspectral (HSI) formats. The SHARC can also be upgraded to support live data downlink via common data link (CDL) format. The ground station is built entirely from commercial off-the-shelf hardware and includes custom image processing and manipulation software.

Working in conjunction with the Naval Air Systems Command (NAVAIR), the Space Dynamics Laboratory (SDL) developed the SHARC ground station for use in aircrew training, mission results validation, target verification, and on-site maintenance assistance. The state-of-the-art image processing software on the SHARC is based on technology originally developed by SDL for the US Navy’s first completely digital reconnaissance pod program. While currently configured for use with the ATARS system, the SHARC’s modular design allows for expansion to support additional sensors and data devices. New generation SHARCs provide change detection (CD) capability as well.

**SHARC Overview**

**Rugged, COTS components**
- Dual-processor PC with DVD±R/RW, CDRW/DVD-ROM and AT-3 tape
- Three 19-inch flat panel displays
- UPS compatible with shipboard power
- InkJet color printer
- STANAG 4575-compliant interface to the SSR
- Rack mounted components housed in two ruggedized transit cases

**System Capabilities**
- Compatible with the National Imagery Transmission Format (NITF) Standard, the Basic Image Interchange Format (BIF), ISO/IEC 12087-5 and STANAG 4575
- Compliant with Common Imagery Ground Surface System (CIG/SS) Distributed Common Ground Station (DCGS) architecture, standards and interfaces
- Integrated GPS data output with PFPS/FalconView flight mapping application
- Compatible with RemoteView imaging software (pre-installed)
- Expandable to support CDL live data link through the inclusion of a CDL Interface Box (CIB)

**Supported Sensors**
- SHARP, ATARS, TARS, and others

**Data Acquisition Options**
- Ethernet 10/100/1000
- DVD/CD
- Removable Memory Module (RMM)
- Local Disk

**Image Product Database**
- Real-time sensor data ingest
- Rapid searching via meta-data support
- Rapid air-to-ground IPDB data sharing
- Transmitted/air-stored data merge
- Simultaneous support for multiple sensor types

**Situational Awareness Options**
- Major city icon display
- Supports FalconView Cross-application support
- Full tracks/image footprints
- Digital map support
- Vector/Vector Smart map
- Digital nautical chart
- TIROS, CADRG, CIB, DTED,GeoTIFF
- Supports ELINT, MANENT, MIDB, MTI

**Change Detection Capability**
- Image rectification, correlation, and auto-flicker

**Real-Time Net-Centric Operations**
- Network server-enabled IPDB
- Supports multiple distributed exploitation stations
- Extensible to third-party applications via net server modules

**Image Display Options**
- Pan/zoom/rotate
- Magnify image area
- North indicator
- Thumbnail Waterfall

**Target Locating Options**
- Target Lat/Lon pointers
- Target tracking
- Target mensuration
- Lat/Lon-based operator designated cues

**Image Manipulation Options**
- Contrast/color enhancement
- Annotation (destructive and non-destructive): Text, line, rectangle, ellipse
- Histogram equalization
- Line detection
- Image blending

**SHARC Display Station**

SHARC Ground Display Station

SHARC Display Station used for data capture, display, and exploitation.

Change Detection Workstation interfaces with the SHARC for retrieval of processed imagery data and is hardware configurable.

Vantage software receives, decompresses, processes, displays, evaluates, exploits, and stores imagery data in support of the SHARC.
Physical Description

**SHARC.** The SHARC is housed in two compact racks, with each rack mounted in a rugged transit case. The left rack contains one flip-up monitor, one flip-down monitor, the UPS, a power strip, a mouse, keyboard, and storage drawer. The right rack contains a computer, one flip-up monitor, a printer, a power strip, a Gigabit Ethernet switch, the removable SSR, and the SSR power supply.

**SHARC Physical Specifications**

<table>
<thead>
<tr>
<th>Power Input:</th>
<th>85-270 VAC, 46-70 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>Left Case: 256 lbs</td>
</tr>
<tr>
<td></td>
<td>Right Case: 223 lbs</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Each transit case with lids:</td>
</tr>
<tr>
<td></td>
<td>28.6&quot; x 22.2&quot; x 34.5&quot;</td>
</tr>
<tr>
<td>Capacities:</td>
<td>3.6 GHz Dual processor with 4 GB memory,</td>
</tr>
<tr>
<td></td>
<td>73 GB system drive, 588 GB RAID, 1.44 MB floppy, 8.5 GB DVD/CD (4.7 GB dual-layer)</td>
</tr>
</tbody>
</table>

**Functional Description**

The SHARC system screens image data from an ATARS sensor that has been previously recorded to the SSR. As the image files are staged from the SSR via a high-speed interface, the software displays decimated image thumbnails in a continuous waterfall of image frames according to the given sensor model and navigation data. The operator has full control over the waterfall’s speed, direction, magnification level, and display of annotation data captured from the pod. If the data is dual-mode (EO/IR), two waterfalls are used to separate the visible and infrared imagery.

When an area of interest appears on the waterfall, the operator may select one or more frames to “chip” to a full-resolution window. The full resolution image is the same fidelity as that received from the sensor and can be manipulated (zoomed, panned, rotated, contrast enhanced, etc.) or annotated with text or graphic overlays. Image products may then be printed, saved to disk, or disseminated to another station via Ethernet connection.

In addition to image screening and analysis functions, the SHARC also provides the capability to archive data to and from the digital storage device to support data duplication and back up.

**CD Workstations.** New display stations are equipped with workstations for enhanced viewing of tactical imagery. These CD workstations interface with the SHARC for retrieval of process imagery data. The CD workstations accommodate more than one operator to simultaneously view ATARS data. The workstations are hardware configurable. The current SHARC workstation consists of a Supermicro computer, two displays consisting of one flip up and one flip down monitor, a pull-out keyboard, mouse tray, and storage drawer. Workstations can be stored and transported in rugged cases.

**CD Workstations Physical Specifications**

<table>
<thead>
<tr>
<th>Power Input:</th>
<th>110/240VAC, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>280 lbs</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Transit case with lids:</td>
</tr>
<tr>
<td></td>
<td>28.6&quot; x 22.2&quot; x 34.5&quot;</td>
</tr>
<tr>
<td>Capacities:</td>
<td>2.66 GHz Quad-Core Intel Xeon Processor with 4 GB memory, 147 GB system drive, 882 GB RAID, 1.44 MB floppy drive, 8.5 GB DVD/CD (4.7 GB dual-layer)</td>
</tr>
</tbody>
</table>

**Menu Exit**

**Z Microsystems**

**A**

**B**

**Menu Exit**

**Z Microsystems**

**A**

**B**

**Menu Exit**

**Z Microsystems**

**A**

**B**

**Menu Exit**

**Z Microsystems**

**A**

**B**