# ISR Allocation

The purpose of this project is to look at decision-making for target detection using ISR.

All responses are non-attributional. No identifying information will be provided to your commanding officer or anyone else outside of the researchers involved in the project. Point of Contact: Jonathan Bakdash, Army Research Lab, jonathan.z.bakdash@us.army.mil, (410) 278-9050

**Instructions**

**Page 2:** Please fill out several demographic and experience questions.

**Pages 3-6:** Decide which sensor(s) on ISR platforms are good enough or better than needed to detect a target. Assume optimal conditions (ideal weather, time of day, and angle) and typical range for target detection. Ignore platform speed.

**Pages 7-10:** The same as *Pages 3-6*, except you will be given the NIIRS ratings of the sensors and the definitions of the NIIRS ratings (*Use the* ***last 4 pages***).

Ratings for sensors are based on open source information. They may not match actual classified capabilities. Please use the NIIRS ratings provided here.

Feel free to look at your responses on *Pages 3-6*, if you think they would help and/or start from "scratch." Please do not change your previous answers.

Demographic Questions

**1)** Gender: **Male** ☐ **Female** ☐

**2)** Age **____ years**

**3)** MOS ____

**4)** Rank ____

**5)** Number of Years of Service: Enlisted for _____ **years**

**6)** Active Duty ☐ or Retired ☐

**7)** Number of Deployments _____

**8)** Deployment: Echelons and Roles (for example, Battalion S2)

_____

_____

**9)** Are you *familiar* with the capabilities (sensors, speed, etc) of air ISR platforms (such as UAVs)**?**

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| Not at all | A little bit | Moderately | Highly | Expert |

**10)** Are you *familiar* with the National Imagery Interpretation Reconnaissance Scale (NIIRS) Ratings for ISR**?**

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| Not at all | A little bit | Moderately | Highly | Expert |

## ISR Platform Sensor(s) for Target Detection

| *Target* | Which sensor(s) can detect the target? **(Check boxes)** | | | |
|---|---|---|---|---|
| 1) Moving Car, Jeep, or Humvee | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |
| 2) Moving Military Support Vehicle w/ Wheels (such as a Stryker, Transport Truck, or Semi-Truck) | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |
| 3) Known location, detect and identify a person with a hand-held missile launcher | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |

| | | | | |
|---|---|---|---|---|
| 4) Known location, detect and identify a license plate on a vehicle | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |
| 5) Stationary Tank or Other Vehicle w/Tracks | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |
| 6) Deployed Scud Missile Site, Not Covered by Camouflage | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |

| | | | | |
|---|---|---|---|---|
| 7) Hole from Digging (1 meter by 1 meter or larger) | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |
| 8) Heat from a Running, but Stationary Car | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global Hawk* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Shadow 200* | **Visible** ☐ | **IR** ☐ | |

## ISR Platform Sensor(s) for Target Detection

**1)** What is your overall confidence in the sensor assignments to targets?

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| No confidence (Guessing) | Low Confidence | Moderate Confidence | High Confidence | Full Confidence (Certain) |

**2)** What was your strategy for making these decisions (Examples: *Used your gut or intuition, guessed, etc*)?

_____

_____

_____

_____

## ISR Platform Sensor(s) for Target Detection with NIIRS

**Use the NIIRS Ratings and NIIRS Scales** *on the last 4 pages*
(these pages don't have numbers)

| *Target* | Which sensor(s) can detect the target? **(Check boxes)** |
|---|---|
| 1) Moving Car, Jeep, or Humvee | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |
| 2) Moving Military Support Vehicle w/ Wheels (such as a Stryker, Transport Truck, or Semi-Truck) | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |
| 3) Known location, detect and identify a person with a hand-held missile launcher | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |

| | |
|---|---|
| 4) Known location, detect and identify a license plate on a vehicle | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |
| 5) Stationary Tank or Other Vehicle w/Tracks | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |
| 6) Deployed Scud Missile Site, Not Covered by Camouflage | *Predator A* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Reaper* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Raven* **Visible** ☐ **IR** ☐<br>*Global Hawk* **Visible** ☐ **IR** ☐ **Radar** ☐<br>*Shadow 200* **Visible** ☐ **IR** ☐ |
| | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7) Hole from Digging (1 meter by 1 meter or larger) | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Reaper* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | *Raven* | **Visible** ☐ | **IR** ☐ | |
| | *Global* Hawk | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | Shadow 200 | **Visible** ☐ | **IR** ☐ | |
| 8) Heat from a Running, but Stationary Car | *Predator A* | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | Reaper | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | Raven | **Visible** ☐ | **IR** ☐ | |
| | Global Hawk | **Visible** ☐ | **IR** ☐ | **Radar** ☐ |
| | Shadow 200 | **Visible** ☐ | **IR** ☐ | |

## ISR Platform Sensor(s) for Target Detection with NIIRS

1) What is your overall confidence in the sensor assignments to targets?

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| No confidence (Guessing) | Low Confidence | Moderate Confidence | High Confidence | Full Confidence (Certain) |

2) Did you use your previous decisions (from page 3)?

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| Not at all | A little bit | Some | Mostly | Completely |

3) What was your strategy for making these decisions (Examples: *Looked at NIIRS ratings, guessed, went off of previous decisions, etc*)?

_____

_____

4) Would you find a system that recommended or suggested optimal ISR platforms/sensors for target detection tracking helpful?

| **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |
| Never | Once in a while | Sometimes | Often | Always |

5) General comments about the project?

_____

_____

# USE ONLY with pages 7-10

**ISR Platform NIIRS Ratings and Sensors**

| Platform type | NIIRS Rating | Sensors |
|---|---|---|
| **1) Predator A (MQ-1)** | • Visible NIIRS rating 6<br>• IR NIIRS rating 6<br>• RADAR NIIRS rating 6 | • EO/IR Camera<br>• SAR |
| **2) Reaper (MQ-9)** | • Visible NIIRS rating 8<br>• IR NIIRS rating 8<br>• RADAR NIIRS rating 6 | • EO/IR Camera<br>• SAR |
| **3) Raven** | • Visible NIIRS rating 6<br>• IR NIIRS rating 6 | • EO/IR Camera |
| **4) Global Hawk** | • Visible NIIRS rating 8<br>• IR NIIRS rating 8<br>• RADAR NIIRS rating 8 | • EO/IR Camera<br>• SAR |
| **5) Shadow 200 (RQ-7)** | • Visible NIIRS rating 7<br>• IR NIIRS rating 7 | • EO/IR Camera |

# Visible NIIRS, March 1994

**Rating Level 0**

Interpretability of the image is precluded by obscuration, degradation, or very poor resolution.

**Rating Level 1**

Detect a medium-sized port facility and/or distinguish between taxiways and runways at a large airfield.

**Rating Level 2**

Detect large hangars at airfields.

Detect large static radars (e.g., AN/FPS-85, COBRA DANE, PECHORA, HENHOUSE).

Detect military training areas.

Identify an SA-5 site based on road pattern and overall site configuration.

Detect large buildings at a naval facility (e.g., warehouses, construction hall).

Detect large buildings (e.g., hospitals, factories).

**Rating Level 3**

Identify the wing configuration (e.g., straight, swept, delta) of all large aircraft (e.g., 707, CONCORD, BEAR, BLACKJACK).

Identify radar and guidance areas at a SAM site by the configuration, mounds, and presence of concrete aprons.

Detect a helipad by the configuration and markings.

Detect the presence/absence of support vehicles at a mobile missile base.

Identify a large surface ship in port by type (e.g., cruiser, auxiliary ship, noncombatant/merchant).

Detect trains or strings of standard rolling stock on railroad tracks (not individual cars).

**Rating Level 4**

Identify all large fighters by type (e.g., FENCER, FOXBAT, F-15, F-14).

Detect the presence of large individual radar antennas (e.g., TALL KING).

Identify, by general type, tracked vehicles, field artillery, large river crossing equipment, wheeled vehicles when in groups.

Detect an open missile silo door.

Determine the shape of the bow (pointed or blunt/rounded) on a medium-sized submarine (e.g., ROMEO, HAN, Type 209, CHARLIE II, ECHO II, VICTOR II/III).

Identify individual tracks, rail pairs, control towers, switching points in rail yards.

**Rating Level 5**

Distinguish between a MIDAS and a CANDID by the presence of refueling equipment (e.g., pedestal and wing pod).

Identify radar as vehicle-mounted or trailer-mounted.

Identify, by type, deployed tactical SSM systems (e.g., FROG, SS-21, SCUD).

Distinguish between SS-25 mobile missile TEL and missile support vans (MSVs) in a known support base, when not covered by camouflage.

Identify TOP STEER or TOP SAIL air surveillance radar on KIROV-, SOVREMENNY-, KIEV-, SLAVA-, MOSKVA-, KARA-, or KRESTA-II-class vessels.

Identify individual rail cars by type (e.g., gondola, flat, box) and/or locomotives by type (e.g., steam, diesel).

**Rating Level 6**

Distinguish between models of small/medium helicopters (e.g., HELIX A from HELIX B from HELIX C, HIND D from HIND E, HAZE A from HAZE B from HAZE C).

Identify the shape of antennas on EW/GCI/ACQ radars as parabolic, parabolic with clipped corners, or rectangular.

Identify the spare tire on a medium-sized truck.

Distinguish between SA-6, SA-11, and SA-17 missile airframes.

Identify individual launcher covers (8) of vertically launched SA-N-6 on SLAV-class vessels.

Identify automobiles as sedans or station wagons.

**Rating Level 7**

Identify fitments and fairings on a fighter-sized aircraft (e.g., FULCRUM, FOXHOUND).

Identify ports, ladders, vents on electronic vans.

Detect the mount for antitank guided missiles (e.g., SAGGER on BMP-1).

Detect details of the silo door hinging mechanism on Type III-F, III-G, II-H launch silos and type III-X launch control silos.

Identify the individual tubes of the RBU on KIROV-, KARA-, KRIVAK-class vessels.

Identify individual rail ties.

**Rating Level 8**

Identify the rivet lines on bomber aircraft.

Detect horn-shaped and W-shaped antennas mounted atop BACK TRAP and BACKNET radars.

Identify a hand-held SAM (e.g., SA-7/14, REDEYE, STINGER).

Identify joints and welds on a TEL or TELAR.

Detect winch cables on deck-mounted cranes.

Identify windshield-wipers on a vehicle.

**Rating Level 9**

Differentiate cross-slot from single-slot heads on aircraft skin panel fasteners.

Identify small, light-toned ceramic insulators that connect wires of an antenna canopy.

Identify vehicle registration numbers (VRN) on trucks.

Identify screws and bolts on missile components.

Identify braid of ropes (3–5 inches in diameter).

Detect individual spikes in railroad ties.

# IR NIIRS, April 1996

**Rating Level 0**

Interpretability of the imagery is precluded by obscuration, degradation, or very poor resolution.

**Rating Level 1**

Distinguish between runways and taxiways on the basis of size, configuration or pattern at a large airfield.

Detect a large (e.g., greater than 1 $km^2$) cleared area in dense forest.

Detect large ocean-going vessels (e.g., aircraft carrier, super-tanker, KIROV) in open water.

Detect large areas (e.g., greater than 1 $km^2$) of marsh/swamp.

**Rating Level 2**

Detect large aircraft (e.g., C-141, 707, BEAR, CANDID, CLASSIC).

Detect individual large buildings (e.g., hospitals, factories) in an urban area.

Distinguish between densely wooded, sparsely wooded and open fields.

Identify an SS-25 base by the pattern of buildings and roads.

Distinguish between naval and commercial port facilities based on type and configuration of large functional areas.

**Rating Level 3**

Distinguish between large (e.g., C-141, 707, BEAR, A-300 AIRBUS) and small aircraft (e.g., A-4, FISHBED, L-39).

Identify individual thermally active flues running between the boiler hall and smoke stacks at a thermal power plant.

Detect a large air warning radar site based on the presence of mounds, revetments, and security fencing.

Detect a driver training track at a ground forces garrison.

Identify individual functional areas (e.g., launch sites, electronics area, support area, missile handling area) of an SA-5 launch complex.

Distinguish between large (e.g., greater than 200m) freighters and tankers.

**Rating Level 4**

Identify the wing configuration of small fighter aircraft (e.g., FROGFOOT, F-16, FISHBED).

Detect a small (e.g., 50$m^2$) electrical transformer yard in an urban area.

Detect large (e.g., greater than 10m diameter) environmental domes at an electronics facility.

Detect individual thermally active vehicles in garrison.

Detect thermally active SS-25 MSVs in garrison.

Identify individual closed cargo hold hatches on large merchant ships.

**Rating Level 5**

Distinguish between single-tail (e.g., FLOGGER, F-16, TORNADO) and twin-tailed (e.g., F-15, FLANKER, FOXBAT) fighters.

Identify outdoor tennis courts.

Identify the metal lattice structure of large (e.g., approximately 75m) radio relay towers.

Detect armored vehicles in a revetment.

Detect a deployed transportable electronics tower (TET) at an SA-10 site.

Identify the stack shape (e.g., square, round, oval) on large (e.g., greater than 200m) merchant ships.

**Rating Level 6**

Detect wing-mounted stores (i.e., ASM, bombs) protruding from the wings of large bombers (e.g., B-52, BEAR, BADGER).

Identify individual thermally active engine vents atop diesel locomotives.

Distinguish between a FIX FOUR and FIX SIX site based on antenna pattern and spacing.

Distinguish between thermally active tanks and APCs.

Distinguish between a 2-rail and 4-rail SA-3 launcher.

Identify missile tube hatches on submarines.

**Rating Level 7**

Distinguish between ground attack and interceptor versions of the MIG-23 FLOGGER based on the shape of the nose.

Identify automobiles as sedans or station wagons.

Identify antenna dishes (less than 3m in diameter) on a radio relay tower.

Identify the missile transfer crane on an SA-6 transloader.

Distinguish between an SA-2/CSA-1 and a SCUD-B missile transporter when missiles are not loaded.

Detect mooring cleats or bollards on piers.

**Rating Level 8**

Identify the RAM airscoop on the dorsal spine of FISHBED J/K/L.

Identify limbs (e.g., arms, legs) on an individual.

Identify individual horizontal and vertical ribs on a radar antenna.

Detect closed hatches on a tank turret.

Distinguish between fuel and oxidizer multisystem propellant transporters based on twin or single fitments on the front of the semitrailer.

Identify individual posts and rails on deck edge life rails.

**Rating Level 9**

Identify access panels on fighter aircraft.

Identify cargo (e.g., shovels, rakes, ladders) in an open-bed, light-duty truck.

Distinguish between BIRDS EYE and BELL LACE antennas based on the presence or absence of small dipole elements.

Identify turret hatch hinges on armored vehicles.

Identify individual command guidance strip antennas on an SA-2/CSA-1 missile.

Identify individual rungs on bulkhead mounted ladder.

# Radar NIIRS, August 1992

**Rating Level 0**

Interpretability of the imagery is precluded by obscuration, degradation, or very poor resolution.

**Rating Level 1**

Detect the presence of aircraft dispersal parking areas.

Detect a large cleared swath in a densely wooded area.

Detect, based on presence of piers and warehouses, a port facility.

Detect lines of transportation (either road or rail, but do not distinguish between).

**Rating Level 2**

Detect the presence of large (e.g., BLACKJACK, CAMBER, COCK, 707, 747) bombers or transports.

Identify large phased array radars (e.g., HENHOUSE, DOGHOUSE) by type.

Detect a military installation by building pattern and site configuration.

Detect road pattern, fence, and hardstand configuration at SSM launch sites (missile silos, launch control silos) within a known ICBM complex.

Detect large noncombatant ships (e.g., freighters or tankers) at a known port facility.

Identify athletic stadiums.

**Rating Level 3**

Detect medium-sized aircraft (e.g., FENCER, FLANKER, CURL, COKE, F-15).

Identify an ORBITA site on the basis of a 12-m dish antenna normally mounted on a circular building.

Detect vehicle revetments at a ground forces facility.

Detect vehicles/pieces of equipment at a SAM, SSM, or ABM fixed missile site.

Determine the location of the superstructure (e.g., fore, amidships, aft) on a medium-sized freighter.

Identify a medium-sized (approximately six-track) railroad classification yard.

**Rating Level 4**

Distinguish between large rotary-wing and medium fixed-wing aircraft (e.g., HALO versus CRUSTY transport).

Detect recent cable scars between facilities or command posts.

Detect individual vehicles in a row at a known motor pool.

Distinguish between open and closed sliding roof areas on a single bay garage at a mobile base station.

Identify square bow shape of ROPUCHA class (LST).

Detect all rail/road bridges.

**Rating Level 5**

Count all medium helicopters (e.g., HIND, HIP, HAZE, HOUND, PUMA, WASP).

Detect deployed TWIN EAR antenna.

Distinguish between river crossing equipment and medium/heavy armored vehicles by size and shape (e.g., MTU-20 versus T-62 MBT).

Detect missile support equipment at an SS-25 RTP (e.g., TEL, MSV).

Distinguish bow shape and length/width differences of SSNs.

Detect the break between railcars (count railcars).

**Rating Level 6**

Distinguish between variable and fixed-wing fighter aircraft (e.g., FENCER versus FLANKER).

Distinguish between the BAR LOCK and the SIDE NET antennas at a BAR LOCK/SIDE NET acquisition radar site.

Distinguish between small support vehicles (e.g., UAZ-69, UAZ-469) and tanks (e.g., T-72, T-80).

Identify SS-24 launch triplet at a known location.

Distinguish between the raised helicopter deck on a KRESTA II (CG) and the helicopter deck with main deck on a KRESTA I (CG).

Identify a vessel by class when singly deployed (e.g., YANKEE I, DELTA I, KRIVAK II FFG).

Detect cargo on a railroad flatcar or in a gondola.

**Rating Level 7**

Identify small fighter aircraft by type (e.g., FISHBED, FITTER, FLOGGER).

Distinguish between electronics van trailers (without tractor) and van trucks in garrison.

Distinguish by size and configuration between a turreted, tracked APC and a medium tank (e.g., BMP-1/2 versus T-64).

Detect a missile on the launcher in an SA-2 launch revetment.

Distinguish between bow-mounted missile system on KRIVAK i/II and bow-mounted gun turret on KRIVAK III.

Detect road/street lamps in an urban, residential, or military complex.

**Rating Level 8**

Distinguish the fuselage difference between a HIND and a HIP helicopter.

Distinguish between the FAN SONG E missile control radar and the FAN SONG F based on the number of parabolic dish antennas (three versus one).

Identify the SA-6 transloader when other SA-6 equipment is present.

Distinguish limber hole shape and configuration differences between DELTA I and YANKEE I (SSBNs).

Identify the dome/vent pattern on rail tank cars.

**Rating Level 9**

Detect major modifications to large aircraft (e.g., fairings, pods, winglets).

Identify the shape of antennas on EW/GCI/ACQ radars as parabolic, parabolic with clipped corners, or rectangular.

Identify, based on presence or absence of turret, size of gun tube, and chassis configuration, wheeled or tracked APCs by type (e.g., BTR-80, BMP-1/2, MT-LB, M113).

Identify the forward fins on an SA-3 missile.

Identify individual hatch covers of vertically launched SA-N-6 surface-to-air system.

Identify trucks as cab-over-engine or engine-in-front.