

2. "Laser" diagnostic equipment capable of measuring "Super-High Power Laser" (SHPL) system angular beam steering errors of equal to or less than 10 microradians;
3. Optical equipment, assemblies or components specially designed for a phased-array SHPL system for coherent beam combination to an accuracy of $\lambda/10$ at the designed wavelength, or 0.1 micrometre, whichever is the smaller;
4. Projection telescopes specially designed for use with SHPL systems;

(For shared aperture optical elements, capable of operating in SHPL applications, see Item 2023.d. on the Munitions List.)

1061. 6. Magnetometers

1061. 6. "Magnetometers", "magnetic gradiometers", "intrinsic magnetic gradiometers" and compensation systems, and specially designed components therefor, as follows:

NOTE:

1061.6 does not embargo instruments specially designed for biomagnetic measurements for medical diagnostics, unless they incorporate unembedded sensors embargoed by 1061.6.h.

- a. "Magnetometers" using "superconductive", optically pumped or nuclear precession (proton/Overhauser) technology having a "noise level" (sensitivity) lower (better) than 0.05 nT rms per square root Hz;
- b. Induction coil "magnetometers" having a "noise level" (sensitivity) lower (better) than:
 1. 0.05 nT rms per square root Hz at frequencies of less than 1 Hz;
 2. 1×10^{-3} nT rms per square root Hz at frequencies of 1 Hz or more but not exceeding 10 Hz; *or*
 3. 1×10^{-4} nT rms per square root Hz at frequencies exceeding 10 Hz;
- c. Fibre optic "magnetometers" having a "noise level" (sensitivity) lower (better) than 1 nT rms per square root Hz;
- d. "Magnetic gradiometers" using multiple "magnetometers" embargoed by 1061.6.a., b. or c.;
- e. Fibre optic "intrinsic magnetic gradiometers" having a magnetic gradient field "noise level" (sensitivity) lower (better) than 0.3 nT/m rms per square root Hz;
- f. "Intrinsic magnetic gradiometers", using technology other than fibre-optic technology, having a magnetic gradient field "noise level" (sensitivity) lower (better) than 0.015 nT/m rms per square root Hz;
- g. Magnetic compensation systems for magnetic sensors designed for operation on mobile platforms;
- h. "Superconductive" electromagnetic sensors, containing components manufactured from "superconductive" materials:
 1. Designed for operation at temperatures below the "critical temperature" of at least one of their "superconductive" constituents (including Josephson effect devices or "superconductive" quantum interference devices (SQUIDS));
 2. Designed for sensing electromagnetic field variations at frequencies of 1 kHz or less; *and*:
 3. Having any of the following characteristics:
 - a. Incorporating thin-film SQUIDS with a minimum feature size of less than 2 micrometres and with associated input and output coupling circuits;
 - b. Designed to operate with a magnetic field slew rate exceeding 1×10^6 magnetic flux quanta per second;
 - c. Designed to function without magnetic shielding in the earth's ambient magnetic field; *or*
 - d. Having a temperature coefficient less (smaller) than 0.1 magnetic flux quantum/K;

1061. 7. Gravimeters

1061. 7. Gravity meters (gravimeters) and gravity gradiometers, as follows:

- a. Gravity meters for ground use having a static accuracy of less (better) than 10 microgal;

NOTE:

1061.7.a. does not embargo ground gravity meters of the quartz element (Worden) type.

- b. Gravity meters for mobile platforms for ground, marine, submersible, space or airborne use having:

1. A static accuracy of less (better) than 0.7 milligal; *and*
2. An in-service (operational) accuracy of less (better) than 0.7 milligal with a time-to-steady-state registration of less than 2 minutes under any combination of attendant corrective compensations and motional influences;

- c. Gravity gradiometers;

1061. 8. Radar

1061. 8. Radar systems, equipment and assemblies having any of the following characteristics, and specially designed components therefor:

NOTE:

1061.8. does not embargo:

- a. Secondary surveillance radar (SSR);
- b. Car radar designed for collision prevention;
- c. Displays or monitors used for air traffic control (ATC) having no more than 12 resolvable elements per mm.
- a. Operating at frequencies from 40 GHz to 230 GHz and having an average output power exceeding 100 mW;
- b. Having a tunable bandwidth exceeding $\pm 6.25\%$ of the centre operating frequency;

Technical Note:

The centre operating frequency equals one half of the sum of the highest plus the lowest specified operating frequencies;

- c. Capable of operating simultaneously on more than two carrier frequencies;
- d. Capable of operating in synthetic aperture (SAR), inverse synthetic aperture (ISAR) or sidelooking airborne (SLAR) radar mode;
- e. Incorporating "electronically steerable phased array antennae";
- f. Capable of heightfinding non-cooperative targets;

NOTE:

1061.8.f. does not embargo:

- a. Precision approach radar equipment (PAR) conforming with ICAO standards;
- b. Meteorological (weather) radar.
- g. Designed specially for airborne (balloon or airframe mounted) operation and having Doppler signal processing for the detection of moving targets;
- h. Employing processing of radar signals using:
 1. "Radar spread spectrum" techniques; *or*
 2. "Radar frequency agility" techniques;
- i. Providing ground-based operation with a maximum "instrumented range" exceeding 185 km;

NOTE:

1061.8.i. does not embargo fishing ground surveillance radar.

- j. "Laser" radar or Light Detection and Ranging (LIDAR) equipment, having either of the following:
 1. "Space-qualified"; *or*
 2. Employing coherent heterodyne or homodyne detection techniques and having an angular resolution of less (better) than 20 microradians;

NOTE:

1061.8.j. does not embargo LIDAR equipment specially designed for surveying or for meteorological observation.

- k. Having signal processing sub-systems using "pulse compression" with:
 1. A "pulse compression" ratio exceeding 150; *or*
 2. A pulse width of less than 200 ns; *or*
- l. Having data processing sub-systems with:
 1. "Automatic target tracking" providing, at any antenna rotation, the predicted target position beyond the time of the next antenna beam passage;

NOTE:

1061.8.l.1. does not embargo conflict alert capability in ATC systems, or marine or harbour radar.

2. Calculation of target velocity from primary radar having non-periodic (variable) scanning rates;
3. Processing for automatic pattern recognition (feature extraction) and comparison with target characteristic data bases (waveforms or imagery) to identify or classify targets; *or*