1061. cont'd.

Technical Note:

Active cooling is a cooling technique for optical components using flowing fluids within the subsurface (nominally less than 1 mm below the optical surface) of the optical component to remove heat from the optic.

5. f. 2. Optical mirrors or transmissive or partially transmissive optical or electro-optical components specially designed for use with embargoed "lasers";

g. Optical equipment, as follows:

(For shared aperture optical elements, capable of operating in "Super-High Power Laser" ("SHPL") applications, see Item 2023.d. on the Munitions List.)

1. Dynamic wavefront (phase) measuring equipment capable of mapping at least 50 positions on a beam wavefront with:
   a. Frame rates equal to or more than 100 Hz and phase discrimination of at least 5% of the beam's wavelength; **or**
   b. Frame rates equal to or more than 1,000 Hz and phase discrimination of at least 20% of the beam's wavelength;
2. "Laser" diagnostic equipment capable of measuring "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 µm, whichever is the smaller;
4. Projection telescopes specially designed for use with "SHPL" systems;

6. Magnetometers

"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 µm 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;

7. Gravimeters

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;

8. Radar

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;

d. Meteorological (weather) radar.

8. 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 ± 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 precision approach radar equipment (PAR) conforming to ICAO standards.

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:

a. Fishing ground surveillance radar;

b. Ground radar equipment specially designed for enroute air traffic control and "software" specially designed for the "use" thereof, provided:
   1. It has a maximum "instrumented range" of 500 km or less;
   2. It is configured so that radar target data can be transmitted only one way from the radar site to one or more civil ATC centres;
   *3. It contains no provisions for remote control of the radar scan rate from the enroute ATC centre; **and***
   4. It is to be permanently installed.

N.B.:

The "use" "software" must be limited to "object code" and the minimum amount of "source code" necessary for installation, operation or maintenance.