

3. They do not use coherent "signal processing" between two or more beacons and the hydrophone unit carried by the surface vessel or underwater vehicle; *and*
 4. Transducers, acoustic modules, beacons or hydrophones therefor are not designed to withstand pressures at depths exceeding 1,000 m;
- b. Side-scan sub-bottom profile systems no portion of which is specially designed for operation at depths exceeding 1,000 m;

Optical Sensors

- c. Image intensifier tubes incorporating microchannel-plates, not specially designed for cameras embargoed by 1061.3.;
N.B.:
Note 11.c. does not apply to tubes incorporating a gallium arsenide (or similar semiconductor) photocathode.
- d. "Optical fibre preforms" specially designed for the manufacture of silica-based optical fibres, provided they are specially designed to produce non-militarized silica-based optical fibres that are optimized to operate at a wavelength not exceeding 1,370 nm;

Cameras

- e. Mechanical framing cameras embargoed by 1061.3.a.2. designed for civil purposes (i.e., non-nuclear use) with a framing speed of not more than 2 million frames per second;

Lasers

- f. "Tunable" pulsed flowing-dye "lasers" having all of the following, and specially designed components therefor:
1. An output wavelength less than 800 nm;
 2. A "pulse duration" not exceeding 100 ns; *and*
 3. A peak output power not exceeding 15 MW;
- g. CO₂, CO or CO/CO₂ "lasers" having:
1. An output wavelength in the range from 9,000 to 11,000 nm;
 2. A pulsed output not exceeding 2 J per pulse and a maximum rated average single or multimode output power not exceeding 5 kW; *or*
 3. A CW maximum rated single or multimode output power not exceeding 10 kW;
- h. Minimum quantities of semiconductor "lasers" designed and intended for use with a civil fibre optic communication system which would be either unembargoed or eligible for administrative exceptions treatment under Note 6 to Category 1050 (Telecommunications), having an output wavelength not exceeding 1,370 nm and a CW power output not exceeding 100 mW.

1070. NAVIGATION AND AVIONICS

1071. Equipment, Assemblies and Components

1. Accelerometers designed for use in inertial navigation or guidance systems and having any of the following characteristics, and specially designed components therefor:
 - a. A "bias" "stability" of less (better) than 130 micro g with respect to a fixed calibration value over a period of one year;
 - b. A "scale factor" "stability" of less (better) than 130 ppm with respect to a fixed calibration value over a period of one year;
 - c. Specified to function at acceleration levels exceeding 100 g;
1071. 2. Gyros having any of the following characteristics, and specially designed components therefor:
 - a. A "drift rate" "stability", when measured in a 1 g environment over a period of three months and with respect to a fixed calibration value, of:
 1. Less (better) than 0.1° per hour when specified to function continuously below 10 g; *or*
 2. Less (better) than 0.5° per hour when specified to function from 10 to 100 g inclusive;
 - b. Specified to function at acceleration levels above 100 g;
1071. 3. Inertial navigation systems (gimballed and strapdown) and inertial equipment for attitude, guidance or control having any of the following characteristics, and specially designed components therefor:
 - a. For "aircraft":
 1. Navigation error (free inertial) of 0.8 nautical mile per hour (50% Circular Error Probable (CEP)) or less (better) subsequent to normal alignment;
 2. Not certified for use on "civil aircraft" by civil aviation authorities of a member country; *or*
 3. Specified to function at acceleration levels exceeding 10 g;

- b. For land or "spacecraft":
 1. Navigation error (free inertial) of 0.8 nautical mile per hour (50% CEP) or less (better) subsequent to normal alignment; *or*
 2. Specified to function at acceleration levels exceeding 10 g;

1071. 4. Gyro-astro compasses, and other devices which derive position or orientation by means of automatically tracking celestial bodies or satellites, with an azimuth accuracy of equal to or less (better) than 5 seconds of arc;
1071. 5. Global Positioning Satellite (GPS) receiving equipment having either of the following characteristics, and specially designed components therefor:
 - a. Employing encryption/decryption; *or*
 - b. A null-steerable antenna;
1071. 6. Airborne altimeters operating at frequencies other than 4.2 to 4.4 GHz inclusive, having either of the following characteristics:
 - a. "Power management"; *or*
 - b. Using phase shift key modulation;
 (For automatic pilots for underwater vehicles, see Category 1080. For radar, see Category 1060. For inertial navigation equipment for ships or submersibles, see Item 2009 on the Munitions List.)

1072. Test, Inspection and Production Equipment

1072. 1. Test, calibration or alignment equipment specially designed for equipment embargoed by 1071., *except* equipment for Maintenance Level I or Maintenance Level II;
- Technical Notes:**
1. **Maintenance Level I**
The failure of an inertial navigation unit is detected on the aircraft by indications from the control and display unit (CDU) or by the status message from the corresponding sub-system. By following the manufacturer's manual, the cause of the failure may be localised at the level of the malfunctioning line replaceable unit (LRU). The operator then removes the LRU and replaces it with a spare.
 2. **Maintenance Level II**
The defective LRU is sent to the maintenance workshop (the manufacturer's or that of the operator responsible for level II maintenance). At the maintenance workshop, the malfunctioning LRU is tested by various appropriate means to verify and localise the defective shop replaceable assembly (SRA) module responsible for the failure. This SRA is removed and replaced by an operative spare. The defective SRA (or possibly the complete LRU) is then shipped to the manufacturer.
N.B.:
Maintenance Level II does not include the removal of embargoed accelerometers or gyro sensors from the SRA.
1072. 2. Equipment, as follows, specially designed to characterize mirrors for ring "laser" gyros:
 - a. Scatterometers having a measurement accuracy of 10 ppm or less (better);
 - b. Profilometers having a measurement accuracy of 0.5 nm (5 angstrom) or less (better);
1072. 3. Equipment specially designed for the production of equipment embargoed by 1071., including:
 - a. Gyro tuning test stations;
 - b. Gyro dynamic balance stations;
 - c. Gyro run-in/motor test stations;
 - d. Gyro evacuation and fill stations;
 - e. Centrifuge fixtures for gyro bearings;
 - f. Accelerometer axis align stations;

1073. Materials

None.

1074. Software

1. "Software" specially designed or modified for the "development" or "production" of equipment embargoed by 1071. or 1072.;
2. "Source code" for the "use" of any inertial navigation equipment or Attitude Heading Reference Systems (AHRS) (*except* gimballed AHRS) including inertial equipment not embargoed by 1071.3. or 1071.4.;