“Alternatives to Pyrotechnic Distress Signals”

Standing Committee on Recreational Boating
Canadian Marine Advisory Council
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Who are we?

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Current Initiative

Congratulations to Transport Canada

- Many rescues are initiated by radio or other remote RF technology
- Expired pyrotechnic distress signals are hazardous waste and environmental contaminant requiring special disposal
- Large proportion of expired flares are illegally dumped in landfills or the environment
- Each flare illegally dumped can contaminate 900,000 litres of water
- 2014 Transport Canada proposal reduces requirement for pyrotechnics by 50% if vessel is equipped with EPIRB or VHF radio or if operator is wearing a 406 MHz PLB

- However, the TC proposal does not include non-pyrotechnic alternative types of visual signal — “Electronic Flares”
### What is an “Electronic Flare”?

**United States CFR Title 46 Part 161.013**

(Night-time Distress Signal for Boats)

- **161.013-5 (a)**
  - white light with peak intensity (horizontal) of at least 75 cd
  - maintains equivalent fixed intensity for at least 6 hours
  - flashes S—O—S
  - automatic signalling when switched on (non-participatory)
  - independent power supply using alkaline batteries
  - floats upright and is submersible
  - 360-degrees signal

- **161.013-5 (b)**
  - hand-held such as the ACR S-O-S light from 1990’s
  - automatic, but light is directional
  - requires manual participation to aim the device

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### Advantages / Disadvantages

<table>
<thead>
<tr>
<th><strong>Electronic Flares</strong></th>
<th><strong>Pyrotechnics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration = min 6 hours at specified intensity C-1001 = 60 + hours total illumination</td>
<td>Rocket = 40 sec  Multi-star = 5.5 sec  Hand = 1 min</td>
</tr>
<tr>
<td>Brilliance = 75 cd</td>
<td>Brilliance = 10,000 to 30,000 cd depending on type</td>
</tr>
<tr>
<td>Safe to operate; no toxic or burning by-products</td>
<td>Risk of fire and injury from burning by-products, toxic smoke</td>
</tr>
<tr>
<td>No disposal problem, fully recyclable Can be tested by owner</td>
<td>Hazardous waste, proper disposal “a drop in the bucket” Cannot be tested</td>
</tr>
<tr>
<td>No Training required</td>
<td>Requires training to operate safely</td>
</tr>
<tr>
<td>Submersible, designed for marine environment</td>
<td>Protection from moisture depends on integrity of plastic bag</td>
</tr>
<tr>
<td>Lasts indefinitely, one-time expense</td>
<td>Recurring expense every 4 years</td>
</tr>
<tr>
<td>Floats upright, may be used by person in water</td>
<td>Pyrotechnics virtually impossible to use in water</td>
</tr>
<tr>
<td>Non-participatory Runs automatically until switched off</td>
<td>Participatory (user-operated) Takes attention away from other rescue/survival tasks</td>
</tr>
</tbody>
</table>
History of “Electronic Flares”  
(Electric Distress Light)

- 46 CFR 161.013 written in 1979
  - To address safety (not disposal) issues
  - At the time, technology did not exist to meet the standard

- 1990’s - ACR – SOS Distress Signal – subsection 5(b)
  - Not a success in the market. Now discontinued

- 2015 - Sirius Signal – C1001 Distress Light – subsection 5(a)
  - Until recently the technology to manufacture 5(a) type lights did not exist
  - Required high efficiency LED lights and optics
  - Uses common alkaline batteries (3 “C” cells)
  - Highly successful introduction to the market at boat shows, etc.
USCG Booklet
A Boater’s Guide to the Federal Requirements for Recreational Boats

- Accepted by the US Coast Guard as a non-pyrotechnic night-time distress signal
- An electric distress light combined with an orange distress flag meets requirements for day and night visual distress signals on:
  - pleasure craft 16 ft. to 65 ft.
  - commercial fishing vessels operating within 3 nautical miles from shore

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Visual Distress Signals for Power-Driven Vessels and Sailing Vessels

<table>
<thead>
<tr>
<th>United States</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parachute Flare</td>
<td>Rocket Parachute Flare</td>
</tr>
<tr>
<td>Red Meteor</td>
<td>Multi-Star Flare</td>
</tr>
<tr>
<td>Red Flare</td>
<td>Hand Flare</td>
</tr>
<tr>
<td>Floating Orange Smoke Signal</td>
<td>Buoyant Smoke Signal</td>
</tr>
<tr>
<td>Orange Smoke Signal</td>
<td>Hand Smoke Signal</td>
</tr>
<tr>
<td>Orange Distress Flag</td>
<td>N/A</td>
</tr>
<tr>
<td>Electric Distress Signal</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Minor differences exist in the standards for certain flare types between the US and Canada.

Canada is moving away from the categorization of flares as Type A, B, C or D and is using the specific names for the flare types.

There are still products being sold under old approvals that use the Type A, B, C or D designations.
### Visual Distress Signals for Power-Driven Vessels and Sailing Vessels

Note: Vessel type exceptions are similar in the US and Canada.

<table>
<thead>
<tr>
<th>Length</th>
<th>United States</th>
<th>Canada (Current Requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 16’ (4.88 m)</td>
<td>Only night signals required:</td>
<td>&lt; 6m (19’ 8”)</td>
</tr>
<tr>
<td></td>
<td>3 day/night flares or 1 Electric Distress Light</td>
<td>1 watertight flashlight or 3 flares (A, B, or C)</td>
</tr>
<tr>
<td>16’-65’</td>
<td>Day and night signals required:</td>
<td>6 - 9m (19’8” to 29’6”)</td>
</tr>
<tr>
<td></td>
<td>3 day/night flares or 3 day flares (smoke) + 1 Electric Distress Light or 1 Distress Flag + 1 Electric Distress Light</td>
<td>1 watertight flashlight and 6 flares (A, B, or C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 - 24m (29’6” to 78’9”)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 watertight flashlight and 12 flares (no more than 6 are smoke)</td>
</tr>
</tbody>
</table>

Note: Unlike the “watertight flashlight”, which may be used for multiple purposes, the Electric Distress Light is a dedicated light. It is only used in emergencies.

### Proposed Changes for Visual Distress Signals (Spring 2014 CMAC)

Note: Vessel type exceptions are similar in the US and Canada.

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<th>Canada (Proposed changes in red)</th>
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<td>&lt; 16’ (4.88 m)</td>
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<tr>
<td>16’-65’</td>
<td>Day and night signals required:</td>
<td>1 watertight flashlight and 6 flares (no smoke) or 3 flares (no smoke) if within 3 [5] miles of shore, and equipped with VHF, EPIRB or PLB</td>
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<tr>
<td></td>
<td>3 day/night flares or 3 day flares (smoke) + 1 Electric Distress Light or 1 Distress Flag + 1 Electric Distress Light</td>
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US Recreational Boats in Canada

- Due to highly successful 2015/16 marketing of the Sirius Signal C-1001 at boat shows and in the media US boaters carrying electronic flares in Canada this summer may be in the thousands.
- This number will increase over the next several years as existing pyrotechnics are retired.
- US vessels are not subject to Canadian carriage requirements if the equipment they carry meets the US carriage requirements (includes carriage of “electronic flares” instead of pyrotechnics).
- Canadian enforcement agencies will need to be informed that “electronic flares” are permitted in the US and are acceptable on US vessels in Canada.

Electronic Flares as “Optional Equipment” in Canada

- Collision Regulations specify S-O-S transmitted by any means is a distress signal (normally as Morse code)
- Small Vessel Regulations apply to pleasure craft and small non-pleasure vessels of 15 gross tonnage or less.
- Small Vessel Regulations set minimum requirements for safety equipment, but do not prohibit additional equipment.
- If “electronic flares” are offered for sale in Canada, retailers should be encouraged to inform Canadian boaters that they do not satisfy the requirements of the Small Vessel Regulations on Canadian vessels but may be carried as additional equipment.

S-O-S

S-O-S is deeply embedded in popular culture
S-O-S is specifically identified as a distress signal in the *Collision Regulations*

S-O-S (and its Morse Code version) should be re-instated into safety messaging in both:

- **Safe Boating Guide**
- **Pleasure Craft Operator Card Syllabus**

Recommendations to the Standing Committee on Recreational Boating

- Consider permitting pleasure craft to carry “electronic flares” that meet 46 CFR 161.13-5(a) in lieu of pyrotechnic flares

- Considerations
  - Area of operation (distance from shore, remoteness)
  - Vessel length
  - Requirement for daytime signals (orange signal flag or smoke)

- Mechanism for change
  - *Small Vessel Regulations* amendment (3 years or more)
  - SVR s.4 Ministerial authorization — if equipment provides an equal or greater degree of safety