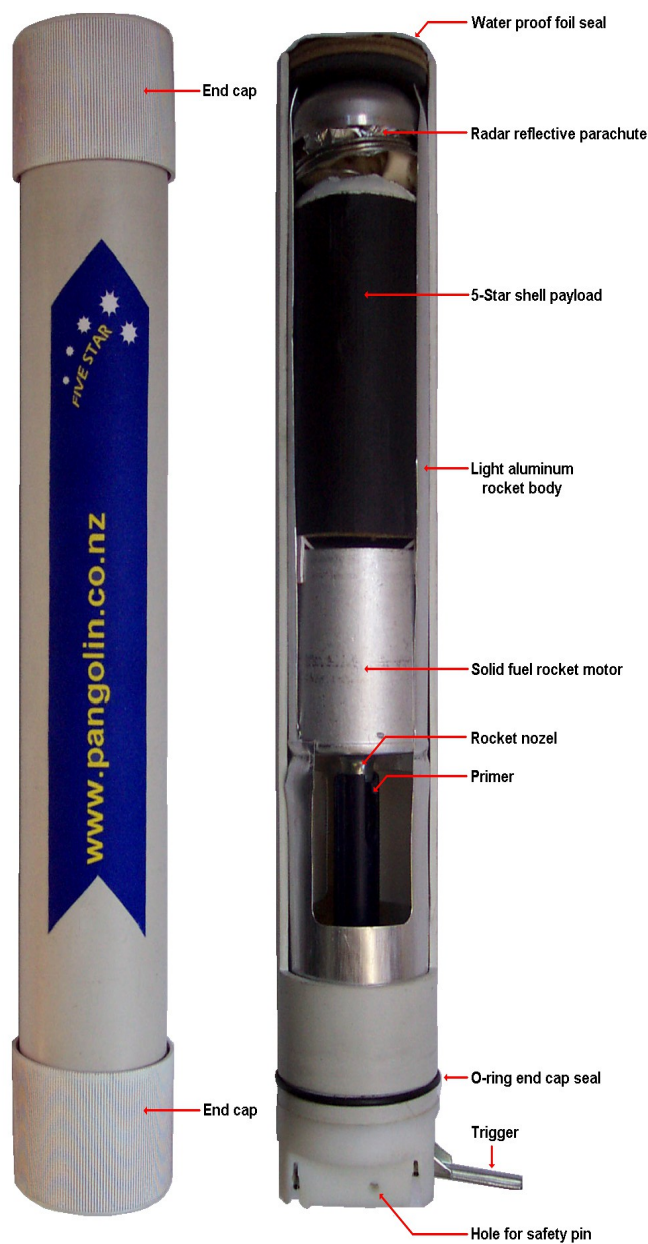


Chance Encounters



ignites a delay fuse and small charge to the payload. This consists of a radar reflective parachute (or foil chaff) and a group of 5 sound and light pyrotechnics. These are similar to the "Bird Frite" shot gun cartridges that are widely used around the world for dispersing birds from airport runways. As the parachute descends, each is ignited by a delay fuse at about one second intervals, thus giving 5 loud sound signals (approximately 140 dB) and 5 brilliant white flashes of light, together with a conspicuous radar target.

The effect upon night vision

Single shot flash/bang pyrotechnics, for shotguns are already manufactured in a number of countries for scaring birds from airport runways or fruit. For attracting attention at sea, particularly at night, they have two important advantages over existing handheld marine flares:

- At the height at which they detonate, sound absorption by waves is much reduced.
- The light signal is not obscured by waves or parts of the boat's structure.
- Night vision is not impaired.

The ability to see well in low light levels is only acquired after the eye has made a number of physiological changes². Typically, these can take 20 minutes or more to complete and include the regeneration of rhodopsin, a visual pigment in the rod receptor cells of the peripheral visual field. In bright light, rhodopsin is bleached and night vision destroyed. However, this process takes many seconds to complete and as a result night vision is relatively unaffected if the light appears as a very short flash, even if it is of high intensity.

In practical terms, it takes a long time for eyes to become fully accustomed to the dark, but use a torch or a flare to attract someone's attention and you destroy their night vision in seconds. Partially blinded, their normal vision is only recovered after a further long period in the dark. If instead, you use a bright, short duration, strobe-like flash, as well as attracting the other party's attention, their ability to respond is preserved.

Confusion with other signals

Could the use of warning pyrotechnics of this type be confused with other signals? Since the intention is to use them as a warning only, confusion with distress signals would be the most serious possibility. The flare colour used for distress signalling is invariably red, and since other colours such as white, yellow, orange or green, are already in common use for other purposes it seems unlikely that a white flash could be perceived as a signal of distress.

A more likely source of confusion could be with the explosive report associated with these devices. As a distress signal, Annex IV of the COLLREGS says, "A gun or other explosive signal fired at intervals of about a minute" However, used for the warning purpose proposed here, the interval between signals would be considerably less than a minute and not repeated over a protracted period.

In some situations, a single sound/light pyrotechnic may be sufficient to establish your presence and concern but when seen from an insulated bridge it could easily be attributed to imagination. To overcome this, the signal would need to be confirmed by a subsequent firing, preferably as a rapid group of 5 in accordance with rule 34d.

When time is precious

When risk of collision is imminent, time is of the essence and how you manage it may be vital.

A common criticism of the use of VHF in these circumstances³ is that valuable moments can be wasted in, for example, making sure that the vessel you are talking to is actually the one that is about to run you down, or in standing by while the OOW (Officer Of the Watch) makes similar checks.

Clearly you need to continuously monitor the other vessel for any change in course or speed. You may also be involved in taking avoiding action or perhaps alerting and preparing other crew members. Standing by on the radio or standing on deck holding a spotlight on your sails or a burning white flare, could be time better spent on other things. In contrast to these methods, the 5-Star takes only seconds to launch, leaving you to get on with other things while it gets on with deploying its sound, light and radar reflective message.

In conclusion

With ever increasing numbers of vessels using our coastal trading routes, close encounters between slow sailing boats and large commercial vessels are a common occurrence. By far the larger part can be resolved by following COLLREGS protocols though not all, and for those that are not, disastrous and most harrowing consequences are a repeated occurrence⁴. When all other attempts at communication have failed, the simple, relatively inexpensive, low technology device proposed here provides small craft mariners with the means to clearly indicate their presence. A device that could ultimately ensure the survival of both them and their vessels.



Once was the time when one could comfortably sail most ocean passage routes without seeing a single other vessel for days or sometimes weeks on end. In some parts of the world this is still possible, though with our seas now populated with ever increasing numbers of vessels of all sizes and on coastal routes in particular, one is seldom far from others. As a result, and in spite of modern technology¹, the risk of collision involving small craft has never been greater. Compared to large commercial ships, differences in speed, size and relative visibility can be truly enormous. On the one hand a smaller sailing or power boat may be no higher than the surrounding waves, while on the other, a typical bulk carrier could be traveling at 10 times the speed and be at least 1000 times the mass.

The difficulties of spotting a small craft at sea are well known to seafarers, and from a small boat perspective the sight of a large vessel heading towards them can carry a certain feeling of trepidation. However, in the vast number of cases adherence to the COLREGS provides a clear and obvious resolution, though not always, and on occasions it can appear that the small boat simply has not been seen.

Having fulfilled COLREGS requirements, options for the small vessel are very limited and are concerned mainly with attracting the attention of the larger. For such a situation the (COLREGS rule 34d) warning signal of 5 or more short and rapid blasts on the whistle is appropriate, though given the power of a typical yacht's whistle or horn, is most unlikely to be heard. This is because minimum distances at which avoiding action needs to be taken are in the order of miles and that the officer of the watch that we are trying to alert is likely to be enclosed within an insulated bridge and may also have background machinery noise. Rule 34d also allows for a light signal to be used, ie 5 or more short and rapid flashes, but to be effective high powers are needed and to avoid being blocked by waves or swell the light needs to be at least at mast height. Other methods of attracting attention that have been used to good effect include calling on VHF, giving a long and two short flashes on a sail with a spotlight, or igniting a white handheld flare. Each can be misinterpreted and has its own attendant difficulties. Given that time for experimenting to find a method that works is limited, I'd like to propose another one that's both effective and takes little time to operate.

The 5-Star Collision Avoidance Pyrotechnic

Although definitely not a distress signal, the 5-Star has a similar construction to the familiar parachute flare. It is a handheld tubular device, a little larger in diameter to a toilet roll former and about three times the length. It is held vertically and at the base there is a trigger that fires a primer that ignites a small solid fuel rocket and pyrotechnic payload. On firing, this reaches a height of approximately 80 metres, where its last remaining fuel further

¹ AIS and Collision Avoidance – a Sense of Déjà vu. I.P.A. Stitt. Journal of Navigation May 2004 Volume 57 May 2004

² Adler's Physiology of the Eye Edited by William M. Hart

³ The "Alva Cape" and the Automatic Identification System: The use of VHF in Collision Avoidance at Sea. S. J. Harding. Journal of Navigation September 2002 Volume 55 No 3 page 431

⁴ <http://www.senate.gov/~commerce/hearings/0421sle.pdf>.

Senate Hearing April 22, 1998 Commerce Committee

Subject: Death on the High Seas (DOSHA)

Testifier: John Sleavin, Brother and Uncle of Mike, Ben, and Annie Rose Sleavin Killed November 24, 1995 by the Pan Grace of Seoul Korea.