

VISUAL SIGNALLING in the RCN and HMCS HAIDA



By Jerry Proc

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1.1 VISUAL SIGNALLING INTRODUCTION

For thousands of years, mariner's communications consisted of simply two types - sound and visual. Bells, whistles and horns were used for sound signalling, while visual signalling employed flags, lights and later on, semaphore signalling. Naturally enough, this form of communication required the development of codes in order for the sound or visual signalling to have any meaning. It soon became evident that even a single flag in a prominent position could serve to transmit a clear and comprehensive message.

During WWII, anyone practicing Visual Signalling was known as a Signaller. By 1950 there was a CR, CS, CV, CC, rating all with the same badge with the exception of the letter in the circle. Shortly after that, the navy combined the CV and CR to CM and made them one and the same. The CM ratings did a watch in the radio room and then did a watch on the bridge as a Signaller. This only lasted a couple of years and it was just too much for one trade. They went back to CR and CV. CV was Communicator Visual, the Signaller. The CC disappeared sometime around 1953. Just before 1960 the trade name changed. CV became Signaller SG with crossed flags. When the Armed Forces unified in 1968, the trade was renamed to SIGSEA and in 2007 is known as NAVCOM.

| | | |
|--|--|---|
|  |  |  |
| Ordinary Signaller and Signal Boy badge in 1937. (Via Spud Roscoe) | Signaller badge from 1955 to 1968 (Via Spud Roscoe) | The uniform for junior ranks up to P2, was square rig. This was the badge worn on that uniform. |



This article, titled "Communications Branch Split Into Visual, Radio Sections" from the April 1951 edition of Crowsnest Magazine, details the changes in 1950.

"Shortly after WWII it was considered that the requirement for visual signalling had been greatly reduced by the increased use of radio and the fact that the Electrical branch had assumed the maintenance of radio equipment. As a result, the rates of Signaller and Telegraphist were combined to form the Communicator trade. Since Visual signalling has been regaining its former importance, approval was recently given to the splitting of the Communications branch into Visual (CV) and Radio (CR) sections.

In peacetime, all visual and cryptographic duties will be carried out by the Visual men while radio duties will, of course, be the responsibility of the Radio man. In event of hostilities, the old Coder rate of the Second World War would be re-instituted, as well. New entries for the Communications Branch will be entered in the Navy as OSCMS and at the end of new entry training in Cornwallis will proceed to the Communication School, where they will undergo a common basic professional course, upon completion of which selection and volunteering for specific sections will take place. Specialized training will then continue in either the Visual or Radio section. Communicators were allowed until March 15, 1951, to select the section they wished to join and commanding officers have forwarded these preferences to Headquarters in order that separate rosters for Visual and Radio, Communicators may be compiled.

It is hoped, and is probable that there will be an even split between branches. However, if there is a landslide toward either the Radio or Visual section, certain men will have to be allocated arbitrarily to sections in order to maintain a reasonable balance. Men allocated in this manner may subsequently request to transfer within the branch. No changes have been made with respect to trade grouping and substantive structure, except that an oral examination will be required after April 1, 1951, for advancement to Leading Seaman. This examination will be based on the duties performed by the rating during his preceding six months of service and corresponds to the Old Trained Operator examination. It is emphasized that no man will lose roster points or be placed in an inferior roster position to that which he now holds."

Generally speaking, Visual Signalling consists of: Flag hoist, Semaphore, Directional and non-directional flashing light and pyrotechnics. Naval Signalman are usually well versed in maritime weather warning displays from shore based signal towers and coastal, small craft, marinas. Additionally, the "International Rules of the Road" for all vessels on the high seas utilize a number of visual shapes (ie colored canvas balls) and colored light displays on the vessel's mast(s) to indicate "breakdown", divers in the water, etc. Lighthouses and lightships can be identified in daylight by their unique paint schemes and in darkness by the light sequences of their beacons.

Both Directional and Non-Directional flashing light systems utilize International Morse Code. Directional flashing lights are equipped with shutter assemblies operated by handles. Non-Directional flashing lights on the yardarms of vessels utilize a telegraph key. Directional and Non-Directional signal light systems can transmit either "white" or "black" signals. The "white" signals during daylight are a brilliant bare lights. At night, (to reduce the brilliance and glare), the directional lights are fitted with a "reducers" or coloured glass filter hoods. Black (infrared "Nancy") signals are transmitted both directionally and non-directionally, using a *black* covering called a *pot*, a *globe* or *hood* fitted over a regular white bulb. Black light signals are only used during hours of darkness and an infrared viewer or "spotting scope" must be used to see the signal. On directional signal lights or projectors, there is usually a bracket to hold the Nancy "viewer" or "scope" on the barrel of the light so the Visual Signalman can keep the signal light trained and elevated on the target ship while his own ship is rolling or pitching. Both white and black visual light signals can be either *Plain language* or *encrypted*. Signals were decrypted in the ship's code room just as wireless radio signals had to be decrypted. Visual Signalmen also used the "Q" and "Z" operating signals just like wireless radio operators.

Sound Signaling also includes the use of a naval vessel's bell, siren, horn or gun firing. Naval signalman usually assist the Officer-of-the-Deck in deciphering the meaning of any sounds emitted by a vessel that is backing away from a pier or wharf or has intentions of either passing on-coming vessels either to port or starboard. In order to prevent collisions, bell signals are sometimes used during reduced visibility (fog) for the benefit and safety of vessels that are not fitted with radar.

Many personnel from the Women's Royal Canadian Naval Service (abbreviated as WRCNS, pronounced as WRENS) served in the Visual Signalling trade at shore establishments during WWII.

The organization was established on July 31 1942 in order to recruit women to replace men who were leaving for sea duty. Capt. Eustace Brock became the Director and Lt Cdr Isabel Macneill, OBE, became the C.O. of the WRCNS training establishment, namely HMCS Conestoga which was commissioned on June 1, 1943 in Galt Ontario. She was the first woman in the British Commonwealth to hold an independent naval command. There were 22 different job categories open to women, depending on their background and experience. They filled many jobs in every naval base in Canada. Just one year after the WRCNS was established, they were already earning high praise for their efforts. The WRCNS motto was: *To free a man for service afloat*.

During basic training at HMCS Conestoga Ontario, WRENS learned naval rules and regulations - how to obey orders, how to march, and how to salute. After a month, they were posted to other facilities for training in the trade to which they were assigned. For those WRENS designated as Visual Signalers, the next stop was the Communications School at St. Hyacinthe, Quebec or "St. Hy" for short.

VS Wrens replaced VS Sailors (bound for sea duty) at signal stations from St. John's, Newfoundland to Prince Rupert, BC . During the war, visual communication from ship to ship and ship to shore was necessary because radio silence had to be maintained to prevent enemy submarines in and around Canadian waters and at sea from intercepting vital information such as the movement of convoys.

Elsa Lessard, who served at HMCS Coverdale during WWII, reminisces about St. Hyacinthe. "In September 1943, I finally got the six month telegraphist course at St. Hyacinthe, near Montreal. We were housed in really long sheds. A row of 15 or so double-decker bunks lined each wall and down the centre aisle was a series of small pot-bellied stoves, which had to be stoked by us. On fire-duty night you crept around with a flashlight tending each stove in each block (as quietly as possible or else!) and ended the watch with hot kye in the galley. The hardest part of the watch was to wake the Wren who was to replace you and get her on her feet without waking the whole block."

Beatrix Shreiber-Geary, a former WREN VS, describes her posting after St. Hyacinthe " We, the gang of six, were drafted to HMCS Stadacona in Halifax where we started duty watches in the signal towers on top of the Halifax Post Office and at Jetty Three in the Dockyard. Now we could really test our ability to send and receive. Most of the messages were coded and top secret. It was against regulations to signal personal messages, but when the hours were long and there was no activity, we did talk on the light once in a while. At least one VS WREN met her future husband on that light.

At night the ships at anchor in the harbour could only show one small light. From our lofty signal tower it was like a sea of fireflies reflecting in the water. In the morning the harbour was empty; the convoy had slipped silently in the darkness of night. We often wondered how many escaped the German torpedoes while crossing the Atlantic".

Each morning everyone was awakened by a loud "Wakey, Wakey". The PA speaker was eventually stuffed with sanitary pads to muffle the sound. Before breakfast , there were daily route marches along the Yamaska River. A naval band led the way with bell-bottomed WRENS following. It was a healthy and invigorating way to start the day.

WRENS practiced signalling by semaphore from the flag decks on rooftops around the parade square. Many hours were spent every day sending and receiving Morse on the signal lamps, until they were thinking in Morse. Semaphore was taught to musical rhythm, often on the parade square to the accompaniment of the St. Hyacinthe band. From the flag decks they also learned how to hoist signals using flags and pendants. The Fleet Signals Book had to be memorized along with the different flag combinations and their meanings. To even qualify for Visual Signalling, all recruits had to have 20/20 vision without the aid of eyeglasses.

St. Hy had one of the best bands for marching and dancing. At divisions it was difficult to stand at attention for inspection when the band was playing a favourite tune. Dances in the Drill Hall were always fun. The WRENS were outnumbered by sailors four to one so each one typically danced with several different men. It was great for a girl's morale.

On graduation, the WRENS became full-fledged Visual Signallers (VS) , or "Bunting Tossers", as they were sometimes called. They could now proudly wear the "Crossed Flags" on their sleeves.

Because the Visual Signalling branch was such a colourful one, it was selected to publicize the WRCNS for recruitment purposes. A number of photos, taken from St. Hy rooftops during training of WRENS signalling to other WRENS, appeared in major newspapers across Canada.

James McAlister relates his WWII experiences. "I was on five month course at the St. Hyacinthe Communications School in Quebec. Some of the huts had small flag decks. These were equipped with a Signal Projector (SP) for practice use. There were also two masts, one of about 75 feet high for practicing flag hoists. If you lost a halyard, you had to climb up and out on the yardarm to secure it so you made sure that you had a secure connection if possible. There were two types of flag hoists which had to be learned, - Naval and International. In addition to alpha and numeral flags, there were also 26 special identity flags as well as 24 pendants in the Naval system.

The flag decks were used for training in Morse with the lights and also a single flag system which was called Wig-Wag. In addition to alpha and numeric, there were also punctuation, procedure signs and other miscellaneous signs to be learned. We also had to learn semaphore. The only time that I used it was when a Yank ship gave us instructions as we entered New York Harbour and instead of bringing the unused flag to the rest position would fling it out of sight over his shoulder.

It was necessary to obtain a certain proficiency in all aspects of signalling to graduate from the course. Failure to achieve certain milestones would almost guarantee rejection. Although we were never at action stations, I understand that Sigs not on duty may be involved in munitions handling, etc. As I mentioned, we were seldom involved in painting ship and other such duties, as the Confidential Books had to be kept up to date, etc. and visits to the shore signal school for updating.

The Manual of Seamanship 1937, as reprinted for Canadian use in January of 1942, shows Visual Signaller and Wireless Telegraphist as two entirely separate entities and as far as I know they remained so for the remainder of the war years. How I came to have this book is another matter. When I first joined they sent us to run the sea cadet camps on Georgian Bay. A transfer to Comm came through while I was there but it was not acted upon when we returned to York for Basic Training and then not until I had spent 10 weeks training as a Seaman at Cornwallis. Such was life in the wartime Navy.

VS (Visual Signalling) Ratings were the poor souls that stood on the open bridge alongside the signal projectors and acted as lookouts when not using them to send a message. On smaller ships we often had to go back to the old style searchlight, which in some cases, had no return spring on the operating lever for the shutters

WWII naval signalmen who served on the Convoy Commodore's ship would also have had to know convoy signals and I imagine their relationship with the Commodore would be like a Yeoman to the Captain aboard a naval ship during the war. I remember a visit to the Naval College in Greenwich, England a few years ago. At the entrance to the chapel was a memorial to Convoy Commodores and Convoy Signalmen who had paid the supreme sacrifice. The memorial listed all their names".

Don Wagner, Former Signalman Second Class Petty Officer (SM2), (USN 1956-59) adds to this. " The single flag visual signal system that James referred to was also known in the United States Navy as "Wig-Wag". The flag was held above the operator's head - one side was the "Dits", the other side was the "Dahs" (Morse Code with one flag). The United States Army also used this method, as well as the Navy around the turn of the 20th century and before the birth of wireless.

Although I spent the majority of my career as a Cryptologic Technician, being a Signalman was the most enjoyable experience. I was on the "bridge" where decisions were being made and things were happening!"

Spud Roscoe adds. " Anything pertaining to the Royal Canadian Navy from 1910 until 1949 was identical to the Royal Navy. Branches, trades, badges and so on. During World War I the wireless operators were Warrant Officer Telegraphists and were graduates of the civilian radio schools. As far as I know these telegraphists held Certificates of Proficiency in Radio from Britain, Canada and so on. These licenses were created and based on regulations issued by the International Telecommunication Union. During WWII, the Signalman wore crossed flags while the Telegraphist had the wings of mercury."

Bill Loucks, VE3AR, served with the RCN during WWII. He explains the relationship between the VHF radio set and visual signalling. "For security reasons, we usually used VS to communicate with other ships by Morse code, however this was impossible in fog or bad weather. Along came the TBS radio to fill the void. This was an AM transmitter/receiver operating in the range of 60 to 80 MHz and running about 70 watts. TBS acquired the moniker "Talk Between Ships" by those who used it. It was installed in the Chart Room just off the bridge so that personnel on the bridge could use it without the need for a wireless operator. Being VHF, it was considered more secure than HF which could be detected and DF'ed over far greater distances. However, it still was less secure than visual signalling so it was used with discretion. In those days there still was a debate going on between the merits of AM vs FM as the preferred method of modulation for VHF. AM was chosen for the TBS but after the war AM would be abandoned in favour of FM".

1.2 TERMS RELATED TO VISUAL SIGNALLING

Douglas Moore of the Cornwallis Museum provides these terms used in Visual Signalling and some responsibilities of a Signaller from the 60's era.

Manoeuvre - these were conducted using signals from ACP 175.

e.g

Formation 1 - ships are to form column or

Formation 3 - ships are to form line abreast to starboard.

Formation 4- ships form line abreast to port.

(Not to confuse anyone, but strictly speaking these signals mean

Ships form column in order of sequence numbers, and

Ships form line abreast to starboard in order of sequence numbers.

Form 315 - ships are to form on line of bearing of 315 from their guide.

Ship's Message Centre - Signaller looked after the Message Centre. Their job was to distribute all incoming and out-going messages and file the same depending on the subject of the messages. They also looked after the cryptographic messages within the message centre.

Tactical Circuits - Signaller manned the tactical circuits on the bridge and in the Ops room. All signals concerning maneuvers, etc were passed on the tactical circuit.

Tactical Screens - Tactical screens were formations where ships, normally frigates and destroyers, were formed in a circle on different bearings and the same distance from carriers, supply ships, submarines, etc. In other words, they formed the outer shell around the bigger ships such as carriers, supply ships, etc. These screens could be circular, or oriented in a specific direction toward the anticipated threat. In other words, they formed the outer shell around the bigger ships.

Maritime Command - Signaller could be posted to Maritime Command to do either Message Centre work (explained above) or tower work which entailed keeping watch over the harbour. Signals were transmitted from the tower by flag hoist, semaphore or Morse code using a light.

Keith Kennedy adds: "*Joint Ops Codes* (JOC) were used by radiomen sending CW over the radio, and by signalmen using CW and signal projectors. I think the JOC was either a 3 or 4 letter code with each group representing a whole phrase and was considered low grade with only 6 or 8 hour security time. It was seemingly a lot of material to store in the CB vault with little use. I can't recall it ever being employed except during exercises in order to maintain some level of proficiency".

BUNTING TOSSER (BUNTS)

In the Royal Navy, those sailors in the signals branch whose duties include the care and hoisting of signal flags, flags of command and ensigns etc were called Bunting Tossers or *Bunts* for short.

Bunting is the material that flags are made from. Visual Signalmen had the additional duties of repairing and making from scratch, new flags to specifications in a publication. This not only included signal flags but the national flags and ensigns of foreign nations. Many a signalmen became proficient with a sewing machine as a result of this responsibility.

This term Bunting Tosser also found its way into RCN usage. A Petty Officer in the branch was known as a "Yeoman" and a CPO as "Chief Yeoman" - terms that are now extinct in the visual signalling trade. It was the usual practice for the Senior V/S rating to be on the bridge when the Captain was present.

In the USN, Signalmen were called "Skivvy Wavers".

1.3 RESPONSIBILITIES OF A NAVAL COMMUNICATOR TODAY (2007)

In 1984, under the Maritime Occupational Restructure Program (MORP), the name SIGSEA became NAV SIG and in 1998 with the amalgamation of the NRADOP and NAV SIG trades, it became NAV COMM.

The Military Occupation Code (MOC) varied over the years. Some examples are: SIG SEA 261, NAV SIG 262, NAV COMM 277. Then, in the mid 2000's, the MOC acronym became MOSID (**M**ilitary **O**ccupational **S**tructure **I**Dentification). NAVCOMM is now MOSID 00299.

An excerpt from the web page of HMCS Edmonton define the duties of a Naval Communicator circa 2006:

- * Naval Communicators are responsible for the operation of communications information systems and for the implementation of communication procedures and instructions. Naval Communicators (NAV COMMs) are also responsible for the collection, correlation and dissemination of operational and tactical information. NAV COMMs encode, decode and interpret operations, tactical and manoeuvring signals, as well as type, log, and advise on matters related to communications, communication security (COMSEC), ceremonial and fleet manoeuvring.

- * Operate systems which include: shipboard radio/satellite equipment; message processing via local area network; and cryptographic equipment.

- * Communicate by: intership, ship/shore radio teletype; ship/shore satellite, voice and radio teletype; INMARSAT voice, facsimile and email; tactical, international and administrative voice radio; flashing light (Morse code); flag signaling; and semaphore.

* Tactical Signaling: advise command on tactical signaling and ship manoeuvring; and encode/decode and disseminate tactical and manoeuvring signals Perform and advise on shipboard flag ceremonial procedures.

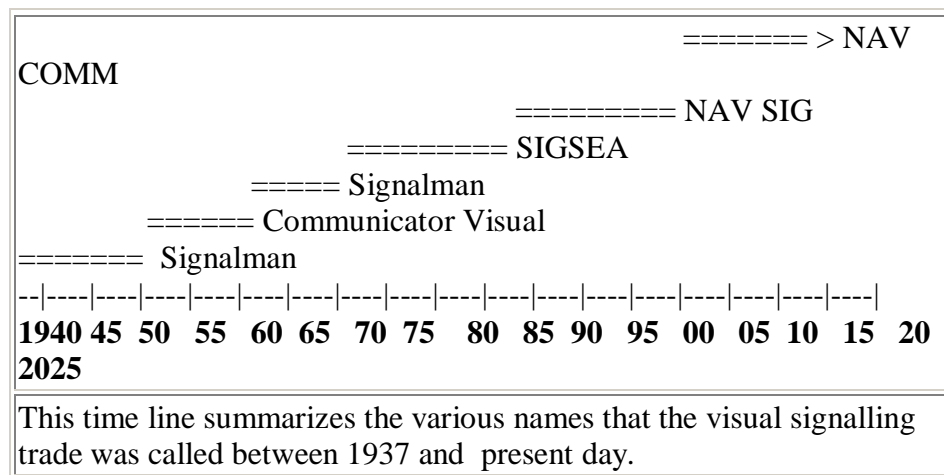
In summary:

1. Maintain watch on VHF and other tactical radio circuits.
2. Maintain visual watch for flashing light, semaphore and flaghoist.
3. Send signals via radio, flashing light, semaphore and flaghoist.
4. Encoding/Decoding of tactical signal in all media
5. Hailing ships on VHF to ascertain identity and intentions.
6. In charge of maintaining a formation picture. Knowing at all times, the identity of ships in a task group and having the ability to move them into various formations based on mission requirements.



CPO2 Derrick Shillington, HMCS Toronto Combat /Training Chief provides this snapshot of the trade in 2007:

"The principal visual duties of the NAV COMM trade remain much the same as they did for the NAV SIG. however, the use of flashing light, semaphore and flag hoist have diminished over the years as technology continues to advance. With the MORP in 1984 , we lost the maintenance of our signal lamps to the electricians and Teletype maintenance to Communication technicians. *Challenge* and *Reply* by visual means is no longer carried out. The use of Morse Code to key infrared light to communicate between ships is no longer used. Bridge communicators do the initial hails using VHF radio for Maritime Interdiction Operations (MIO). Signalman no longer participate in the operations room during naval gunfire support as our guns are no longer used to fire ashore."



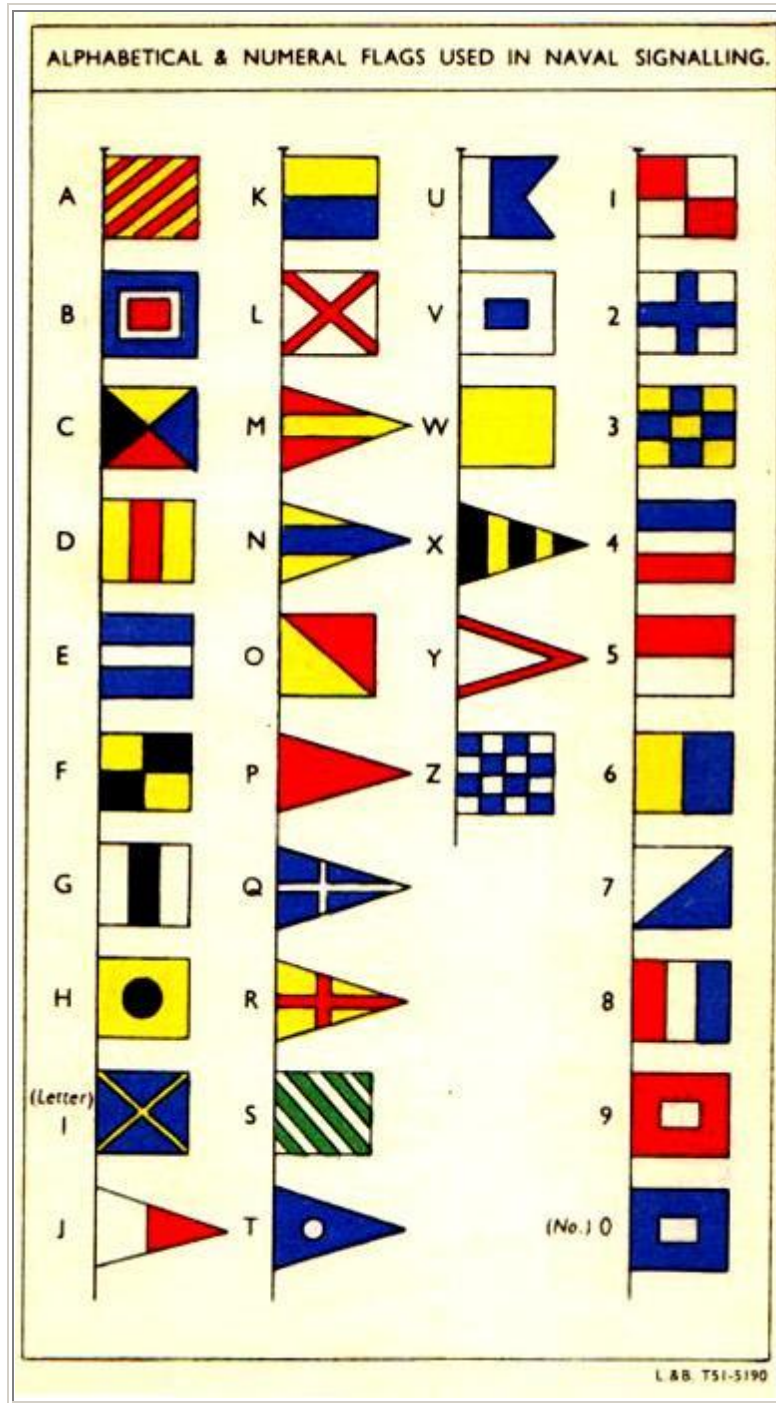
2.0 FLAG SIGNALLING

Even in these days of satellite communications, the RCN still uses (but to a limited degree) the international alphabet flags, numeral pennants, numeral flags, and special flags and pennants for visual signaling. These signal flags are used to communicate with other ships while maintaining radio silence. NAVCOM signalmen transmit messages by hoisting a flag or a series of flags on a halyard. Each side of the ship has halyards and a storage compartment containing a full set of signal flags. Signals unique to the Navy are used when communicating with other navy ships. When communicating with all other vessels, the International Code of Signals is used. Flag signals, physically hoisted on the Signal or Flag Deck were controlled by the Chief Signalman or Yeoman of Signals from the bridge. Today, these terms are extinct.

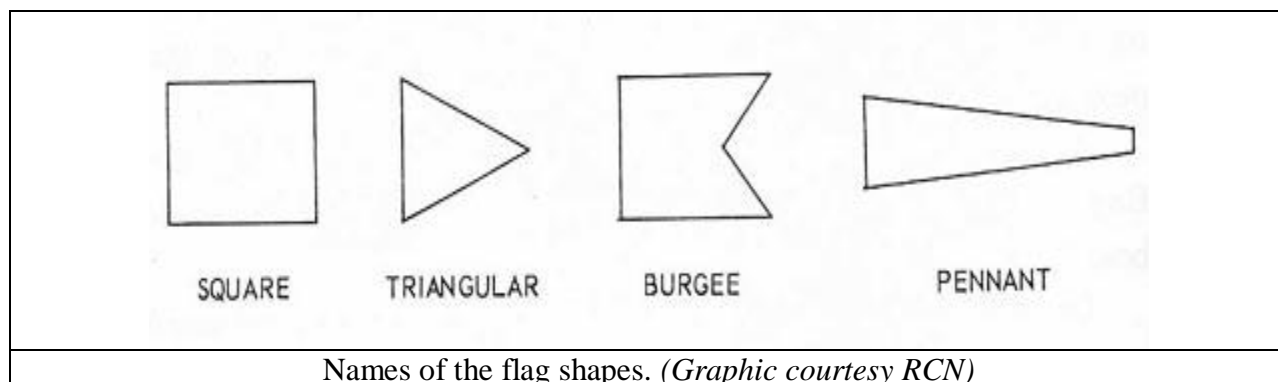
2.1 FLAG SYSTEMS

It would have been so easy had there only been one flag system used by both naval ships and merchantmen. But that was not to be the case. Naval flag systems varied slightly from navy to navy and changed a little over time. International signals used by merchantmen shared the alphabet flags but used numerical pennants instead of square numeral flags. In the interest of brevity, only the alphabetic and numeral flags are posted below since there were a number of other flags in each of the systems which had special meanings. Listed is the RCN flag system circa 1937, the Royal Navy system used by the RCN in WWII and the current (2007) system.

FLAGS USED IN NAVAL SIGNALLING circa 1937



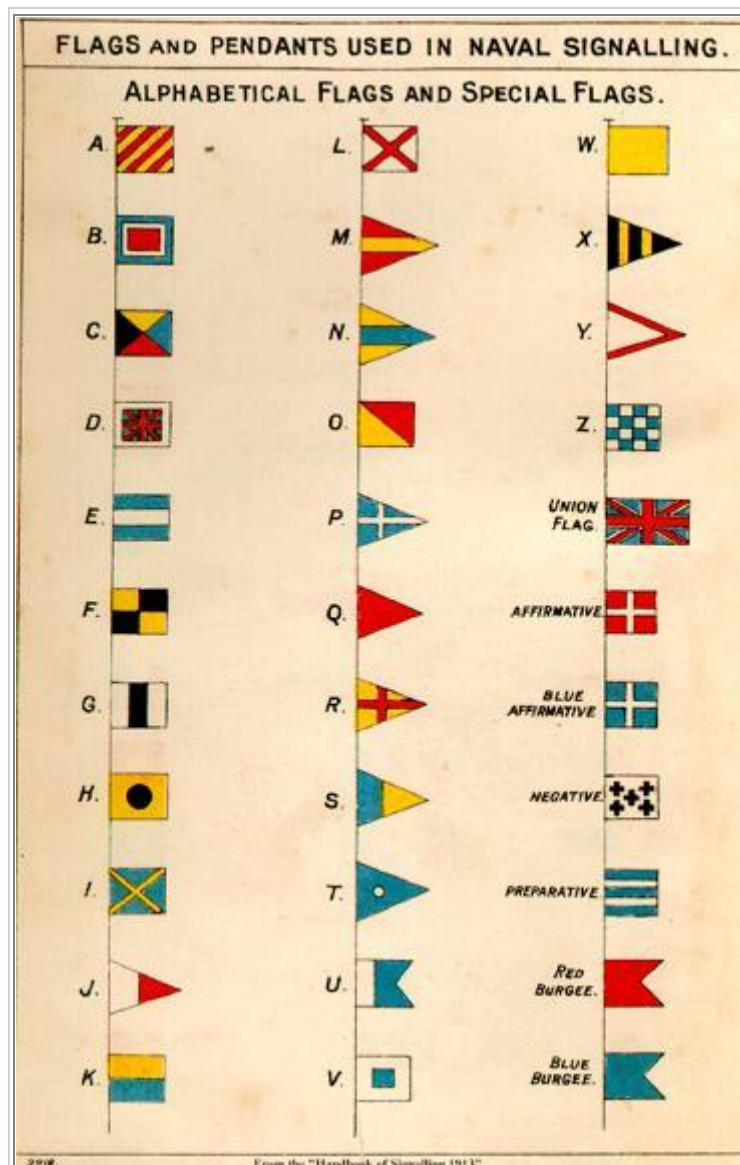
Alphabetical and Numeral Flags Used in Naval Signalling from the Manual of Seamanship, 1937. Government of Canada, Ottawa. This chart cannot be used to accurately decode pendants of RCN ships during WWII. See the RN flag system below. (Image courtesy A&C Society web page)



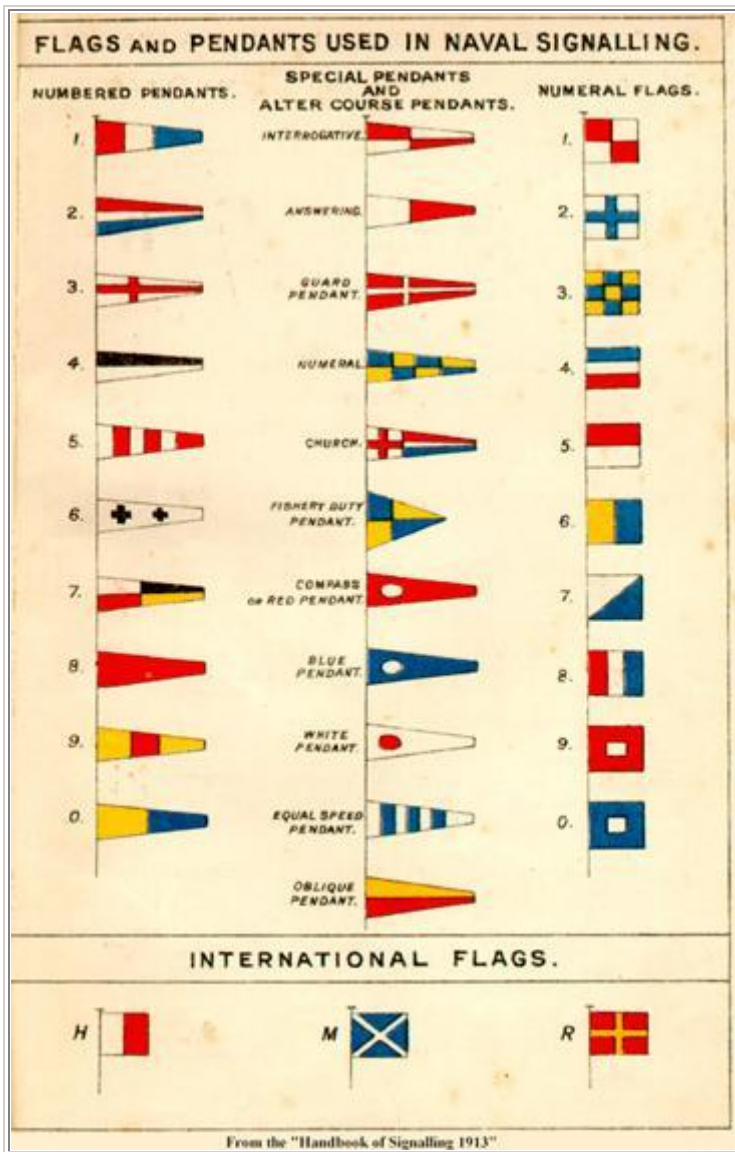
In photos of RCN ships taken during WWII any flag hoist showing the ship's pendant can be decoded using the flag chart depicted directly below. This was the Royal Navy system which dates back to 1913. Duncan Mathieson indicates that "we started with the RN system which developed into the Allied Naval Signal Book (ANSB). When NATO was organized in 1949, the ANSB morphed into ATP1 Vol II which I was involved with amending about 1970. Much to everyone's surprise the USN wished to retain the signal for "Air Bedding" as they still used it!"

Jim McAlister comments. "Quite frankly, flag hoists were just something that was on the syllabus at the St. Hyacinthe Communications School.. With the exception of the one use of semaphore flags with the Yanks in New York City Harbour, I would say that the majority of my experience was with light signalling except when tied up at the jetty. Then the telephone was used. Coming into Halifax, the WRENS at the tower gave berthing instructions by light. In wartime, radio silence was always maintained except in cases of extreme emergency."

1939-1945 (possibly to 1949)



Above and below: This was the flag system used by the RCN during WWII and is the same as that of the Royal Navy. There were additional flags used for signalling which are not shown here in the interest of brevity.
(Images courtesy WWI Document Archive page)



TODAY (2007)

| | | | | | | | | | |
|------------------------------|--|---|--|---|----------------|---|--|---|--|
| A | | K | | U | | 1 | | 1 | |
| B | | L | | V | | 2 | | 2 | |
| C | | M | | W | | 3 | | 3 | |
| D | | N | | X | | 4 | | 4 | |
| E | | O | | Y | | 5 | | 5 | |
| F | | P | | Z | | 6 | | 6 | |
| G | | Q | | | | 7 | | 7 | |
| H | | R | | | | 8 | | 8 | |
| I | | S | | | | 9 | | 9 | |
| J | | T | | | | 0 | | 0 | |
| Maritime Signal Flags | | | | | Penants | | | | |

This is the current system of alphabet and numeral signal flags. The square numeral flags are used by naval ships while the numeral pennants are used by merchantmen. *(Graphic courtesy Computer Science Now web page)*

Don Wagner, provides this explanation for the use of square numeric flags versus numerical pennants. "International merchant vessels communicate with each other visually using a universal code book that all member countries print in their respective languages. Both the alphabet flags (A through Z) and numeral pennants (0-9) are universal in design.

Now, supposing the fictitious USS Neversail is sailing across the Atlantic and comes across a merchantman dead in the water with the flag signal AB1 flying from the merchantman's yardarm. The signalman on the Neversail breaks out the "International Code of Signals" (publication HO-87 for the US). Looking it up, the signalman finds that AB1 might mean "I am broken down and in need of pumping equipment". The Officer of the Deck on the Neversail must reply using HO-87 International Code of Signals that the merchant vessel can understand, so he

orders his signalman to hoist LC36 which could mean something like "Will send damage control party with pumps in small craft. Prepare to receive boat on your starboard side". In this case, numeral pennants must be used because the merchantman does not know the meaning of the Allied Naval Numeral Flags.

When Allied warships are communicating with each other and there are NO merchantmen from any nation involved, they use flaghoist signals contained in Allied Communications Publications (ACPs). Square, naval Numeral Flags are used instead of Numeral Pennants when signaling using ACPs.

When there were a mix of Allied merchantmen and Allied naval ships involved such as WWII convoys, visual communications codes were contained in the Convoy Operations Orders and distributed to each vessel involved both Naval and Merchant. These orders were usually at least up to level "Confidential" and were routinely changed."



A ship's radio call sign was also displayed by flag hoist when entering or leaving harbour. Often this combination of flags was painted on the end of the signal flag pigeon hole box.

In the case of HAIDA, the flags are painted on the cable trough cover attached to the port side of the foremast. It is not known if this was the original place or whether they were added there when the ship was repainted in 1982. *(Photo by Jerry Proc)*



On Halifax Class frigates, the call sign signal flags are painted near the vicinity of the chaff rocket launchers. (*Photo courtesy Mac's Naval Photography*)

FLAG LOCKERS

The flag locker is the location where the signal flags are stored. The following arrangement is documented in Signalman Trade Group 1 Manual (1963).

| | | | | | | | | | |
|------------|------|----------|---------|-------------|-------|----------|------|-------------|--------|
| p1 | p2 | p3 | p4 | p5 | p6 | p7 | p8 | p9 | p0 |
| A | B | C | D | E | F | G | H | I | J |
| K | L | M | N | O | P | Q | R | S | T |
| U | V | W | X | Y | Z | 1st | 2nd | 3rd | 4th |
| CORPEN | TURN | FORM | STATION | SPEED | DESIG | SQUAD | FLOT | DIV | SUBDIV |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| ANS | INT | PREP | NEGAT | PORT | STBD | CHURCH | | | EMERG |
| BLACK FLAG | | RED FLAG | | YELLOW FLAG | | BLACK PT | | BRAVO LARGE | |
| | | | | | | | | | |

Usage of the flags is explained below. (Image courtesy RCN)

- 1st Row - P1 through P0 are "International Code of Signals" numeral pennants. (Self explanatory)
- 2nd to part of 4th Row - "International Code of Signals" alphabet flags. (Self explanatory)
- Remainder of Row 4 - Substitute flags.
- Row 5 and 7 - Special Naval Flags and Pennants.
- Row 6 - Naval Numerical Flags, 1 through 0. (Self explanatory)
- Row 8 - Special Distinguishing flags.

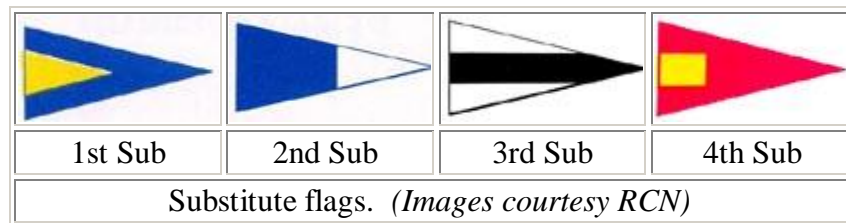


Flag locker aboard HMCS HAIDA, port side. For the special flags, the compartments are labelled slightly different than the standard layout . *(Photo by Jerry Proc)*

SUBSTITUTE FLAGS (labelled 1st, 2nd, 3rd , 4th)

The Substitute Flags in row 4 are used when a flag has to be repeated in a hoist. This makes it possible to have several hoists flying or ready to hoist at the same time without exhausting the available flags. In the 1960's, flag lockers only carried quantity four of each signal flag.

Substitute flags are known as the 1st , 2nd, 3rd and 4th substitutes because they repeat the first, second, third or fourth flags (or pennants) in any given hoist. This count is started from the top of a halyard with tacklines being disregarded.



SPECIAL NAVAL FLAGS and PENNANTS

The Special Naval Flags and Pennants in rows 5 and 7 have the following meanings:

CORPEN (COuRse PENnant) - is defined as a Course Command pennant and is used in connection with altering the course of a single ship or a formation of ships. (Requires additional flags to indicate course)

TURN - Used to signal a turn of a unit or vessel. It requires the use of numeral flags to indicate how many degrees to turn.

FORM (FORMation) - Used to signal which formation unit of ships are to assume, e.g. line abreast or column, , (Requires modifying flags).

STATION - Used to signal which station vessels addressed are to assume (requires modifying flags)

SPEED - Used to signal the speed increase or decrease vessels are to come to upon execution of hoist. (Requires modifying flags)

DESIG (DESIGNation) - used to designate a person, place or object (Requires modifying flags)

SQUAD (SQUADron) - Used to address "this squadron" of naval ships or a specific squadron (Requires modifying flags)

FLOT (FLOTilla) -Used to address "this flotilla" of naval ships or a specific flotilla (Requires modifying flags)

DIV (DIVision) - Used to address "this division" of naval ships or a specific division (Requires modifying flags)

SUBDIV (SUB-DIVision) Used to address a specified sub-division of a formation (Requires modifying flags).

ANS - (ANSwer) This one has multiple meanings. It deals with answering, reports, semaphore messages, defining decimal points and signal modification.

INT - (INTERrogative) - Flag signals which cannot be read or understood or have errors may be responded to by using the INTERrogative pennant.

PREP - This flag can have several meanings and is associated with replenishing, minelaying, morning colours and sunset ceremonies depending on modifications.

NEGAT - (NEGATIVE) As a separate hoist, it cancels all other signals that were hoisted on that yardarm.

PORT - When flown singly, turn to port by an unspecified amount.

STBD - When flown singly, turn to starboard by an unspecified amount.

CHURCH - A quote from "Customs and Traditions of the Canadian Navy" by Graeme Arbuckle indicates the Church Pennant is hoisted in harbour at the peak if fitted and not occupied, or at the yardarm when ship's companies are holding divine services or at prayer". This pennant is treated with respect and moved with a slow steady motion.

EMERG - (EMERGENCY) Has five variations. Signals preceded by the Emergency flag are to be acted upon as soon as understood. The originator of the message sounded six short blasts on the whistle to call attention to the signal. When the emergency flag was used with several groups, it was separated by *tackline* or hoisted on an adjacent superior halyard. Emergency signals made with flags are to be repeated by all ships with the First Substitute and call sign of the originator if other than the OTC (Officer in Tactical Command), the First Substitute. Substitute flags are defined further in the text.

SPECIAL DISTINGUISHING FLAGS

The Special Distinguishing Flags in row 8 were used during exercises.

a) Large **Black Flag** to be hoisted:

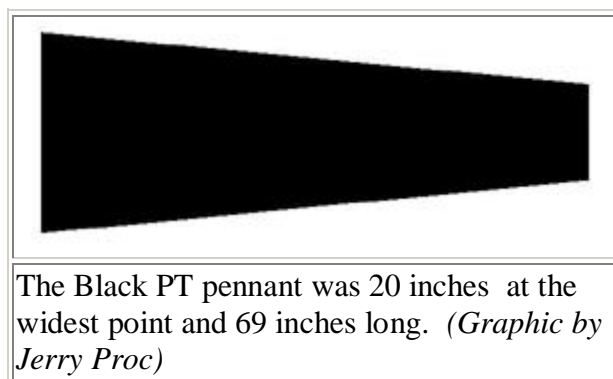
- * By all ships in convoy
- * By all independently routed merchant ships which are taking part in an exercise.

b) Large **Red Flag** to be flown by all Orange Forces which were the ships acting as the enemy.

c) Large **Yellow Flag** to be hoisted:

- * By any ship which is temporarily in an out-of-action state.
- * By warships not taking part but passing through the exercise area. Submarines were to flash the letters OA to opposing forces.

Black PT (Pennant). Used singly and at the dip: I am investigating a sonar contact. Close up (all the way up to the yard arm) : "Contact established, am attacking". Hauled down: have lost sonar contact. The "Dip" means the flag or pennant is only half way up to the yardarm. This pennant is no longer used.



Bravo Large (Red Flag) - it is flown to indicate "danger" of any sort e.g. fuelling, ammunitioning, practice firing, etc.



USN flag bags circa 1958. Contrast this to the RCN flag locker. (*Submitted by SM3 Don Wagner - left*)

Flag signals are executed when the Senior officer hauls down the hoist. This is the instant when all ships carry out the order conveyed by the flag hoist. Hoists are read in the order in which they are hoisted. Normally, this would be from top to bottom, from outward in or from forward to aft. Signals are relayed along a chain of visual responsibility. Each ship was responsible to automatically relay any signal to the next ship on the side away from the originator.

2.2 OTHER FLAGS

SPEED FLAGS

Speed flags are numeral flags that were mounted on wooden staves and displayed on both sides of the bridge to indicate the speed at which the ship is actually travelling through the water. When changed, the old flag was removed from the bracket and the new one was waved overhead for a few seconds to attract the attention of other ships to the change. Speed flags might be used when entering and leaving harbour and occasionally at sea when transferring or manoeuvring in close company.



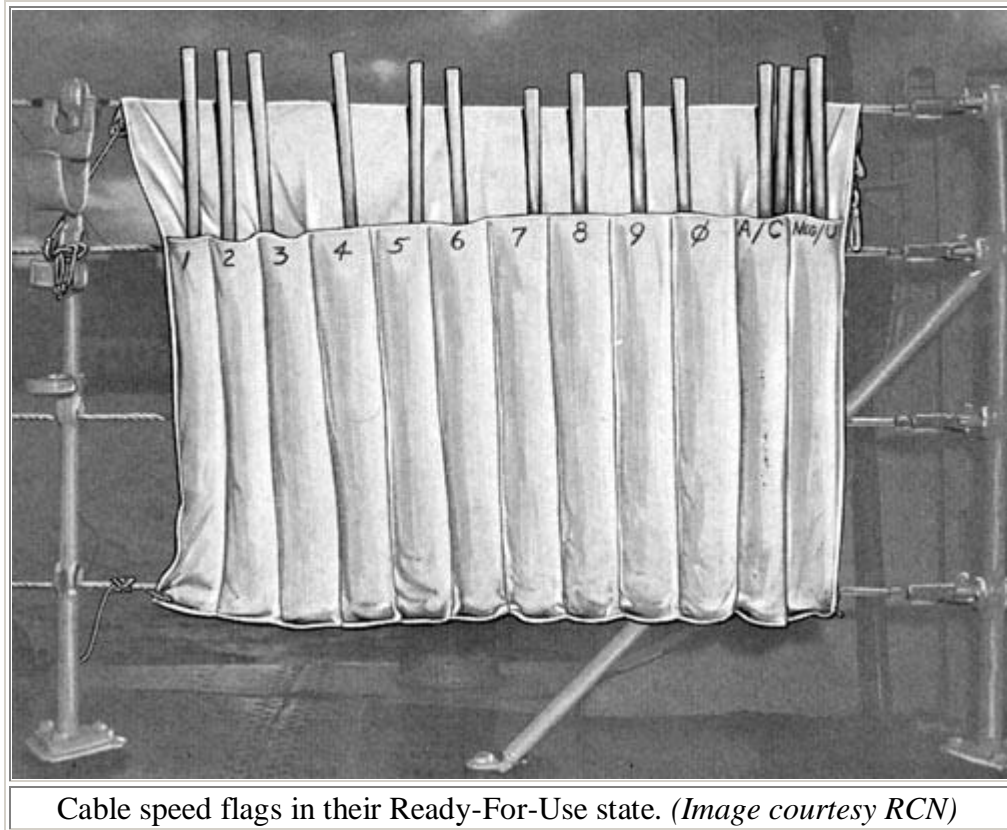
Speed flags. (Image courtesy RCN)

CABLE FLAGS

Cable flags are small flags mounted on staves and in fact, could be the same as Speed Flags. When coming to an anchorage or weighing anchor, a signalman would proceed to his designated sea duty station on the forecandle. He would lace his canvas wallet containing the flags to the guard rail and position himself where he can see the cable and the Cable Officer. The Cable Officer would then inform the Captain through the Signalman and his cable flags, the state of the cable and anchor. The alphabet and numeral flags had the following meanings:

- Numerals 1 through 0 - Indicate the number of the shackle being worked through the hawse pipe.
- Letter U held horizontally - Anchor up and down
- Letter U held vertically - Anchor aweigh
- Letter A held vertically - Clear anchor
- NEGAT flag held vertically - Foul anchor
- Letter C held horizontally - Anchor secured
- Letter C held vertically - Anchor secured

The Signalman Trade Group 1 Manual indicates that for nighttime anchoring, a flashlight or radio was used to convey the same signals as the flags.



Cable speed flags in their Ready-For-Use state. (*Image courtesy RCN*)

ANCHOR FLAGS

Anchor flags were small hand flags mounted on staves. They were red and green with a white anchor design on them. These were used by the Captain to signal the Cable Officer as to which anchor to use and when to let it go. The Captain held the flag overhead and brought it down to indicate the instant when the anchor was to be let go. In response, the Cable Office would acknowledge the signal by repeating it by using an identical set of flags.

SCREW FLAGS

Screw flags consisted of one red and one white flag mounted on staves. They were used when coming alongside or leaving a jetty by informing the bridge whether they were securing or heaving lines which might get caught in the ships propellers. The red flag indicated there were lines in the water while the white flag indicated an all-clear condition. These flags were handled by seamen as directed by the Officer of the Quarterdeck. A Signaller immediately reported any change in the state of the flags to the Captain.

TRANSFER FLAGS

Transfer flags were used during transfers and replenishments to indicate the position in the ship to be used for securing the lines. Telephones were sometimes passed between ships to exchange information about the transfer but the flags, or alternately ping-pong like paddles, acted as a

means of backup. The flags were 3 foot square and were mounted on staves. Coloured paddles were the same shape as that of a ping-pong paddle. The colours had the following meaning:

Green - Ammunition or stores
Red - Fuel Oil
Blue - Diesel Oil
Yellow - Avgas
White - Water



On 2 September 2003, HMCS Glace Bay (inboard) and HMCS Shawinigan (outboard) are being refueled by the merchantman Hamilton Energy at Pier 9, Hamilton, Ont. Both ships were berthed in Hamilton as part of a Lake Ontario cruise and are being refueled prior to departure. Both vessels are flying red Bravo flags indicating there is a fuel oil transfer in progress. Flag Bravo is recognized internationally by both merchantmen and navies as a danger signal and indicates a potentially dangerous procedure is taking place such as refueling or ammunition loading.
(Photo by Jerry Proc)

With flags and paddles, the Officer-in-Charge at the transfer position could pass additional information to the other ship in different ways. The principle methods used were:

Green in circular motion - Start pumping or delivery.
Green in sideways motion - Stop pumping or delivery
White in circular motion - Blow through
White in sideways motion - Stop blowing through.

ABSENTEE INDICATORS

When a ship was in port and between the hours of sunrise and sunset, Substitute flags could be used to indicate the absence of the Captain or other officers as follows:

| | |
|---|--|
| FIRST SUBSTITUTE at starboard main yardarm outboard | Absence of Flag Officer or Unit Commander whose flag or pennant is flying on the ship. |
| SECOND SUBSTITUTE at port main yardarm. When displayed with 3rd Sub, it should be inboard | Absence of Chief of Staff |
| THIRD SUBSTITUTE at port main yardarm , outboard. | Absence of Captain, or the Executive Officer if Captain is absent for a period exceeding 72 hours. |
| FOURTH SUBSTITUTE at starboard main yardarm . When displayed with 1st Sub, it should be outboard. | Absence of civil or military official whose flag is flying in this ship. |

SUBSTITUTES MODIFYING MESSAGE HEADING

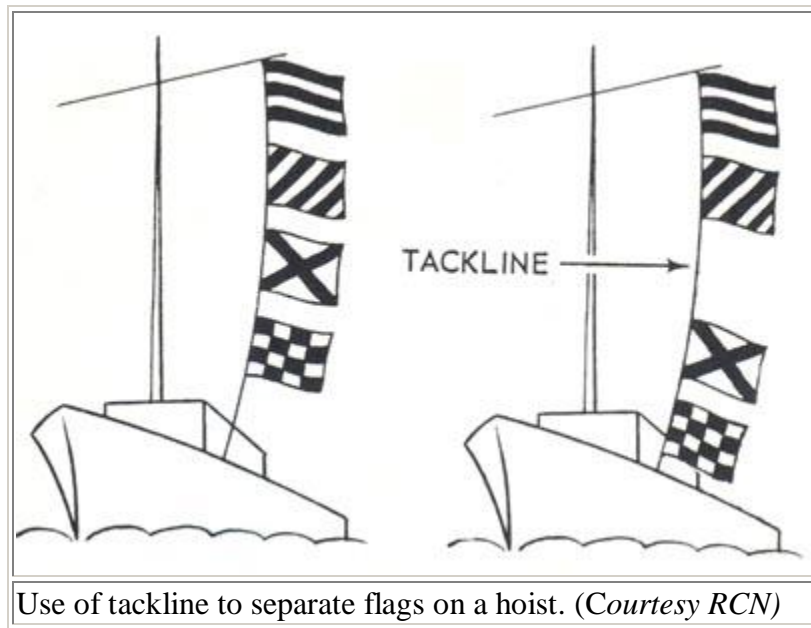
Substitute flags serve another purpose when they are used as a heading for a flag hoist.

| | |
|----------------------------|--|
| FIRST sub over a call sign | The originator of this signal is....intervening ships are to relay to the addressees. |
| SECOND sub over a signal | This signal is for general information . It is not addressed to anyone specifically and no one need answer. |
| THIRD sub over a call sign | This signal is addressed to the call sign indicated for action and also addressed to all other ships for information. Signals preceded by a THIRD sub are relayed and answered in the normal manner. |
| FOURTH sub over a signal | This signal was taken from ACP 148. Wartime Instructions To Maritime Ships. |

HALYARDS and TACKLINE

In the 1960's period, the Signalmans Trade Group 1 manual indicates that signal halyards were made of sisal with some yarns reversed spun to obtain flexibility. They were supplied in coils of 122 fathoms in length and three sizes were used. The circumferences measured 7/8 inch , 1 1/8 inch and 1 1/4 inch in size. The small size was used for small craft and for ensign and jack halyards in larger ships. The medium size was the normal one for signalling.

Tackline is a length of halyard approximately the length of the roping on a flag . It is used to separate flags or groups of flags that would be confusing if they were run together. As an example, If two groups CY and VN were hoisted without the separation provided by the tackline , then the message would read as CYVN which was the international call sign of HMCS Micmac.



HOSTING THE PENDANT

It is not clear when the practice started, but during WWII RCN ships entering and leaving harbour hoisted their pendant. After studying a number of photos, it was observed that these hoists could be either on the port or starboard sides. Sometime after the war the practice changed, possibly in 1949. A number of photos indicate that ships then started to hoist their radio call sign on the port side when leaving or entering harbour. Examples of this are seen in photos of Antigonish (1951), Lanark (1960) and St. Therese (1960). Photos of Stettler (1960) and Whitethroat (1963) show the call sign hoist on the starboard side. It is believed that the practice of hoisting a radio call sign changed from port to starboard sides sometime in 1960. (Can anyone confirm the photographic evidence? Also, can anyone confirm if the practice of hoisting a ships radio call sign instead of a pendant changed in 1949 when the RCN changed the format of the pendant numbering system or alternately, when NATO was born and the Allied Naval Signal Book came into use? Write to: jerry.proc@sympatico.ca)

To further define the procedure, the ship's radio call sign was hoisted on starboard outer when entering and leaving harbour. The hoist occurs on departure when last line is taken inboard and on entering harbour the hoist is taken down when the first line is secured ashore.

Cdr Bob Willson RCN (Ret'd) says" In my experience, 1952-1987, pendant numbers were only used as call signs or addresses in visual signalling procedures e.g flag hoists, semaphore and flashing light and served no other purpose".

Today, radio call signs continue to be hoisted on the starboard side. Cdr. C.A.H. Darlington provides and extract from MANUAL OF CEREMONY FOR HMC SHIPS, SUBMARINES AND NAVAL RESERVE DIVISIONS 2004-11-11:

Call Signs Chapter 2, Section 7, para 10.

HMC Ships, when entering or leaving port shall:

- a. hoist the ship's call sign on the starboard inner / outer yardarm (if not occupied) or at direction of senior ship in company; or
- b. when a senior officer is embarked, hoist his / her call sign on the starboard inner / outer yardarm (if not occupied) and the ship's call sign on the port inner / outer yardarm (if not occupied) or at the direction of the senior ship in company; and
- c. operating within the harbour limits shall not hoist call signs.

Precedence Chapter 2, Section 2, para 5.

The protocol for flags worn by HMC Ships defines the "superior position" on the masts giving precedence to starboard over port. The "superior position" means the precedence, in decreasing order, of the position of flags at the main, fore, mizzen, starboard yard and port yard.

PENDANT vs PENNANT

Sometimes there is confusion between the words "Pendant" and "Pennant". This extract from Chapter Six of a forthcoming book by David J Freeman, "RCN Ship Badges & Insignia, 1910 to 1946" should set the record straight. [used with permission of the author.]

"The term pendant - pronounced pennant – is simply a tapering flag, just like a pennant. In the world of naval communications, however, there were differences. The RN signal system contained not only alphabetical and special flags, but also "numeral flags", "pennants" and "numbered pendants." The latter were a series of tapered pennants: ten were numbers (0 to 9) and 12 others had special meanings. These were the flags flown by a warship to indicate her assigned number. Early in 1914, just before the start of the First World War, British destroyers were ordered to paint their pendant numbers on their hulls. Prior to this, these signal pendants were hard to see through the smoke and spray. The word 'pendant' followed the numbers down to the ship's side."

BREAKING A FLAG

Signalman used the terms "Breaking a Flag" or "Broken at the Yard or Masthead". It means that the flag is folded and rolled and tied off with small pieces of twine (also called marlin) and hoisted to the peak in a ball so the flag cannot be seen or identified from a distance. When it is "Broken", the signalman gives a quick, hard yank on the down-haul halyard breaking the twine (marlin) that held the flag in a ball, thus the flag is free to fly in the breeze.

ENCRYPTION

Visual signals were sometimes encrypted just like radio signals. Suppose we have a group of warships in a circular formation around the Squadron Commander's flagship. If he wanted to send classified information to all the squadron's commanding officers and didn't want any

unauthorized party from reading the message he would encrypt the message and send it to all the commanding officers of his squadron on the yardarm blinkers. Ships in the squadron would acknowledge receipt by directional signal lamp. This method was especially useful during radio silence and to keep enemy submarines and aircraft from intercepting a plain language visual message. (Signalmen and Officers of the Watch generally had these single flag meanings memorized.)

Single flags, as well as multiple flags on a single hoist are considered a "code" and a one of the ACP publications must be used to find the meaning of a single signal flag flying from a yardarm or a vessel's mast or truck.

DIPPING THE COLOURS

Dipping a ship's Ensign or colors to other ships passing in close proximity while underway is referred to as "Dipping the Colours" and is considered a salute.

Warships do not dip their ensigns to other warships. They salute by piping, sounding the bugle, whistle or gun salutes, depending on the ship and the occasion. All hands that are on deck come to attention facing outboard.

The pipe is made "Attention on the upper deck - face starboard (or port). Only the Captain, XO, Officer of the Watch (OOW) or Officer of the Day (OOD) do the actual salute. If the ship is at sea, the salute is done from the bridge. If the ship is in harbour the salute will be done from the quarterdeck. Another blast on bugle or whistle, signals everyone to stop rendering the hand salute then "carry on" dismisses those on deck from the attention position.

Merchant ships passing close to a warship normally dip the colors to show respect to the nation that the warship represents. When a merchant ship dips her colors, it is only common courtesy to return the "salute".

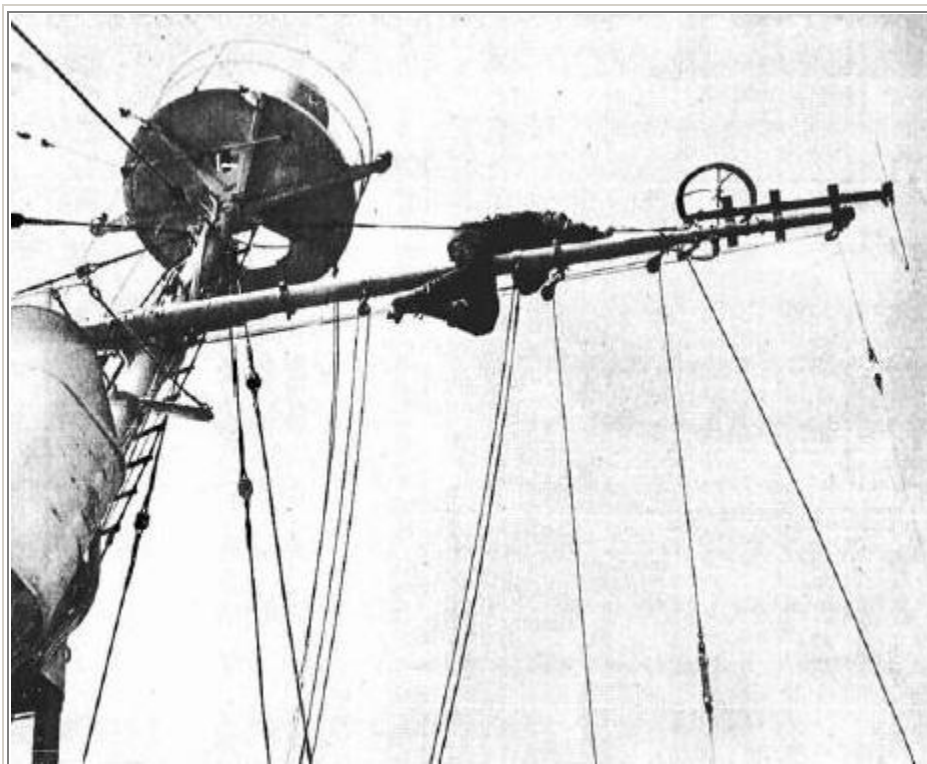
Bob Willson (RCN Ret'd) expands on this. "When *Britannia* ruled the waves, the RN "demanded" that merchant ships of all countries dip their ensign to a British warship and in certain eras, would halt and board a merchant ship that failed to do so. The custom of merchantmen dipping ensigns still persists, although very few merchant ships actually do it any more.

The warship should always return the salute by dipping its ensign, but sometimes they are caught off guard and fail to do so, especially if the warship is alongside in harbour as there are so few people on the duty watch these days. In Halifax in the 50's and 60's, the Master of one of the gypsum carriers that regularly steamed past the dockyard going to and returning from the gypsum pier in Bedford Basin was a Brit. He always dipped to every warship in the harbour, both on entering and leaving, and if one of the ships did not return the salute he would send a telegram to the Admiral reporting the offending vessel and the Captain would get a nasty signal telling him to keep a better lookout in the future. It was quite a game".

Keith Kennedy remembers. "On the ships doing pilotage training in the Gulf Islands, dipping the ensign got to be a pain (though probably good exercise racing between the bridge and mainmast for the signalmen) as every pleasure boat, no matter how small, insisted on dipping their ensign to us".

Don Wagner comments. "In USN, during the Cold War, naval vessels did not initiate Passing Honours (the USN term for Dipping the Colours) to Communist naval vessels. These countries included the USSR, Communist China (CHICOM), North Korea (KORCOM), Albania, Bulgaria and Cuba. If the Communist vessel initiated the equivalent of Passing Honours, then the Honors would be returned".

LOSS OF HALYARD



1950: It is a long standing tradition in the Navy that a signalman who loses a halyard while flag hoisting will go "up the stick" to retrieve it. Here, Cadet David Richards, of Wolfville, N.S., clambers out on the yardarm to secure a lost halyard. Cadet Richards performed his acrobatics aboard HMCS La Hulloise during a summer training cruise. (RCN photo HS-11555)

2.3 FLAGS FOR SPECIAL OCCASIONS

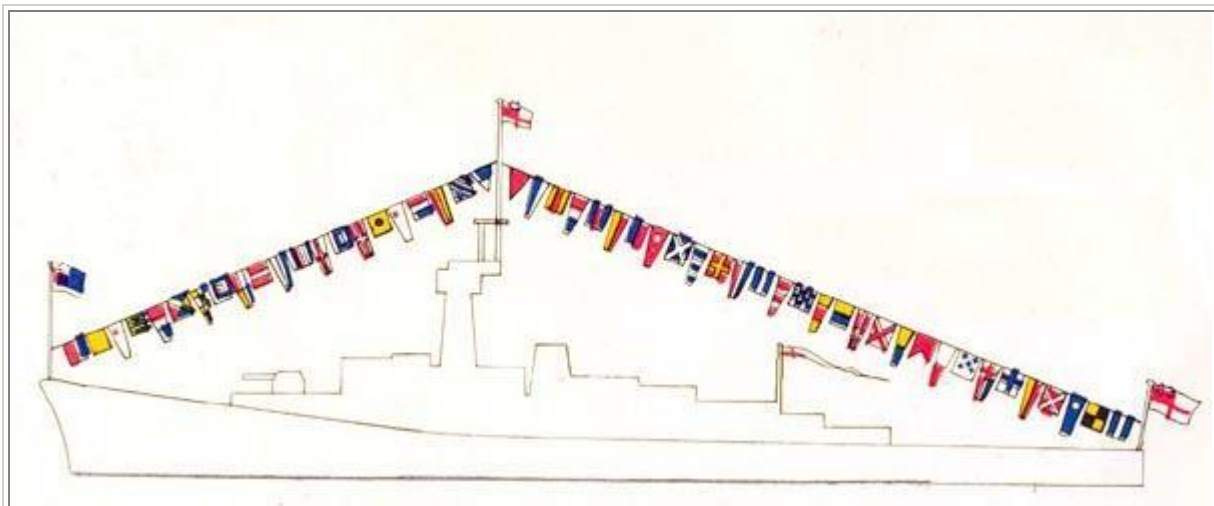
CHRISTMAS DECORATIONS

During Christmas season, evergreen trees were hoisted to the masthead or yardarms. Sometimes they were decorated with coloured lights.

DRESSING SHIP

The flying of flags to celebrate an occasion or an event is one of the oldest customs in the navy. It probably stems from the days when flags and trophies captured from the enemy were displayed as a sign of victory. When a ship is dressed, she flies her ensign, jack, masthead ensigns and dressing lines. On certain occasions when it is not desirable to rig dressing lines, ships may dress with masthead ensigns only. Dressing lines are not used by ships which are underway.

Dressing ship instructions are in the Manual of Ceremony (MOC) for HMC Ships, Submarines and Naval Reserve Divisions. Flags size, method of dressing ships and order of flags on a dressing line for each class of ship is detailed in the MOC.



The order of flags was arranged according to Naval General Orders (Technical) G3. Today (2007), the exact order is found in the Manual of Ceremony. (*Image courtesy RCN*)

GIN PENNANT

This was a green pennant with a white chalice in its centre. It was hoisted in a ship as an invitation to all officers to come aboard to assist in the celebration of some special occasion in the wardroom.



Gin pennant. (*Courtesy
Magellan Flags*)

PAYING-OFF PENNANT

A paying-off pennant is a large version of the masthead pennant. It is flown in lieu of the masthead pennant on the day a ship pays off. The length of the paying-off pennant approximates the length of time that the ship has been in commission.



When HMCS Huron paid off on April 27, 1963 to operational reserve, she flew a balloon supported paying off pendant such as this as she sailed into Halifax for the last time. (*DND photo DNS-30685*)

WEDDING GARLAND

A wedding garland was a large wreath of evergreens with a white bow and trailing white ribbons. It was hoisted in a conspicuous place in a ship to indicate that the wedding of one of her crew is taking place.

SIZE OF COLOURS

A suite of flags, referred to as *colours*, are flown by a ship. This includes the ensign, the jack and the masthead pennant or flag or rank. The size of the colours were traditionally measured in breadths a unit of measurement inherited from the Royal Navy. A breadth is approximately 9 inches. Today, flags are referred to by their metric size in the RCN.

SIZES OF ENSIGNS WORN

| | Week Day | | Sundays | | Dress Ship | |
|--------------------|----------|---------|---------|---------|------------|---------|
| | Sea | Harbour | Sea | Harbour | Sea | Harbour |
| Aircraft Carrier | 4 | 8 | 6 | 10 | 8 | 10 |
| Destroyer, Frigate | 4 | 6 | 4 | 8 | 8 | 8 |
| Minesweeper | 4 | 4 | 4 | 6 | 6 | 6 |

Sizes of Ensigns worn by ships during the 1960's. The size was measured in breadths. (*Image courtesy RCN*)

SIZE OF ENSIGNS, JACKS, DISTINGUISHING FLAGS AND SIGNAL FLAGS

| Ensigns/Jacks/Distinguishing Flags and Pennants | |
|---|---------------------|
| Size | Dimensions |
| 1 | 45cm x 90cm |
| 2 | 67.5cm x 135cm |
| 3 | 90cm x 180cm |
| 4 | 135cm x 270cm |
| 5 | 180cm x 360cm |
| 6 | 225cm x 450cm |
| Signal Flags | |
| 4 | 130cm x 130cm |
| 5 | 108.75cm x 108.75cm |
| 8 | 52.5cm x 52.5cm |

The table lists the different flag sizes and their dimensions circa 2007. (*Manual of Ceremony extract provided by CPO2 Derrick Shillington*)

FLAG SIZES REQUIRED BY HMC SHIPS AND SUBMARINES

| SHIP TYPE | OCCASION | SHIP'S ENSIGN | | MAST HEAD | NAVAL JACK | | DIST/PERS FLAGS | | SIGNAL/ DRESSING LINE FLAGS |
|---------------------|-----------------|---------------|-----|-----------|------------|-----|-----------------|-----|-----------------------------|
| | | SEA | HBR | | SEA | HBR | SEA | HBR | |
| AOR | Daily/Home Port | 3 | 5 | - | - | 4 | 3 | 3 | 4 |
| | Sunday/Holiday | 3 | 6 | - | - | 5 | 3 | 3 | 4 |
| | Dress Ship | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 4 |
| | Port Visit | - | 6 | - | - | 5 | - | - | - |
| DDH FFH | Daily/Home Port | 3 | 5 | - | - | 4 | 3 | 3 | 4 |
| | Sunday/Holiday | 3 | 6 | - | - | 4 | 3 | 3 | 4 |
| | Dress Ship | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 4 |
| | Port Visit | - | 6 | - | - | 4 | - | - | - |
| MSA MCDV | Daily/Home Port | 3 | 4 | - | - | 3 | 3 | 3 | 5 |
| | Sunday/Holiday | 3 | 4 | - | - | 3 | 3 | 3 | 5 |
| | Dress Ship | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 5 |
| | Port Visit | - | 4 | - | - | 3 | - | - | - |
| SS | Daily/Home Port | 2 | 3 | - | - | 2 | 1 | 1 | 8 |
| | Sunday/Holiday | 2 | 3 | - | - | 2 | 1 | 1 | 8 |
| | Dress Ship | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 8 |
| | Port Visit | - | 3 | - | - | 2 | - | - | - |

Note: Ships that do not hold the proper size Masthead Flag/Ensign shall use the size held closest to that listed. The Masthead Flag/Ensign is never to be larger than the Ship's Ensign. UPDATED 20 JUN 07 IAW 191258Z JAN 04

This table (2007) relates the usage of flag size to flag type, location, time and class of ship. (*Manual of Ceremony extract provided by CPO2 Derrick Shillington*)

2.4 SOUND SIGNALS WHICH ACCOMPANY VISUAL SIGNALS

Flag signals were sometimes accompanied with sound signals made by a whistle or sirennette. The sound signals are defined in the *International Regulations for the Prevention of Collision at Sea*. Six short blasts are used to draw attention to flag signals. A short blast is about one second duration while a prolonged blast is 4 to 6 seconds long.

While manoeuvring:

- * One short blast - I am altering my course to starboard.
- * Two short blasts - I am altering my course to port.
- * Three short blasts - My engines are going astern
- * Four short blasts - ?
- * Five short blasts - What are your intentions?
- * Six short blasts - are used to call attention to signals such as man overboard, break-down.

During fog:

- * One prolonged blast every two minutes defines a vessel of over 20 tons making way through the water.
- * Two prolonged blasts every two minutes indicates vessel under way but stopped.

GUN SALUTES

The firing of gun salutes in honour of a royal or other personage is a very old custom. It was originally a sign of friendship. Ships emptied their guns to show they had no hostile intentions. Gun salutes consist of an odd number of rounds ranging from seven for Captains to twenty one for a royal or national salute. They are fired at five second intervals. For royal salutes and salutes to national flags, the appropriate standard or ensign is broken at the mainmast head. For other personal salutes, the flag is broken at the foremast head. The standard or flag is broken at the first gun of the salute and hauled down when the salute is completed.

In the vicinity of a harbour, between sunrise and sunset, naval ships salute one another when passing. This can be a very formal type with guards and bands but is usually carried out with a boatswain's call or bugle. The bugle was reserved for ships flying standards or flags or rank or foreign warships when one of the ships was at anchor.

DRYING WET SIGNAL FLAGS

When signal flags were made from bunting, additional care was required to ensure that mould and mildew did not become a problem especially if the flags were damp. Sometimes the flags were washed but most of the time if the bunting flags became wet, the signalmen would simply attach as many as they could get on a halyard and hoist them up and letting Mother Nature air dry them.

Don Wagner describes how they treated damp or wet flags in the USN in the 1950's. "USN flag-bags had canvas covers that were rolled up and stowed on a metal holder behind the bags. During inclement weather, the bags were covered with the waterproof covers and lashed down securely to prevent moisture (including salt spray taken over the bow and bridge). In good, sunny weather, the first thing we did during "Morning Sweepers" before breakfast, was to "clamp down" the signal bridge decks (swab up the dew that had settled during the night) and open up the flag bags to let them air out. If we detected mold or mildew, we would get a swab bucket and wash the flags in a mixture of salt water and liquid bleach and kill the mold/mildew and drape them over the handrails to completely dry before putting them back in the flag-bags.

Rod Stroud, PO1 HMCS Toronto, advises on current methods. "We now use flags made of nylon and there is no requirement to have the flags dried out like it was done 50 years ago. If they are wet, we shake them out and they pretty much are dry. If they are extremely wet we will hang them in the CCR for a bit before folding them for storage".

2.5 FLAGS SUMMARY

Signalmen were often referred to as the "Eyes and Ears of the Ship" because those involved in visual communications not only had to know flaghoist, semaphore, and flashing light, but they also had to know what the canvas balls hanging from a mast means; running lights and aircraft warning lights; ship's bell and steam whistle signals and the rules of road. Visual signalmen were also versed in aircraft and ship identification and more often than not, picked up air or surface contacts before the ship's lookouts spotted them. The Ship's yeoman, and other experienced signalmen were also intimately acquainted with the rules for manoeuvring, changing formation and so on, and could explain them to the Officers on Watch. Today (2007), the use of flag hoists continues to diminish as technology continues to advance.

3.0 LIGHT SIGNALLING

3.1 DIRECTIONAL AND NON-DIRECTIONAL LIGHT SIGNALLING

Flashing light signalling includes the use of searchlights, yardarm blinkers and signal lanterns employing Morse code, special characters and procedure. Directional flashing light is the term applied to the transmission of signals by a narrow beam of light. Non-directional flashing light is the term applied to the transmission of signals in all directions.

Don Wagner (USN, Ret'd) provides this introduction to Light Signalling. "On RCN or RN naval vessels, the *directional* signal projector was either a 10-inch Signal Projector or a 20-inch Signal Projector. In the U.S. Navy, they also came in two sizes. The 12-inch signal/search light used an incandescent bulb which could also be trained and elevated. There were also 24-inch carbon arc signal/search lights. Both of these lights were equipped with a handle on each side of the barrel (for left or right handed operators to send visual (light) Morse code. The 12-inch range was normally limited to about 14 miles or the horizon. The 24-inch carbon arc was much more brilliant and the signals (at night) could be bounced off the cloud cover and around the curvature of the earth. It has been told in visual communicators circles that a Morse signal sent by light has been confirmed (by radar) to have been sent up to a distance of two ships 80 miles apart!"

3.2 FLASHING LIGHTS

Non-Directional light signaling was accomplished by means of *yardarm blinkers*. The blinkers were operated by telegraph keys fitted on a ship's flag or signal deck. Some vessels also carried infrared blinkers. During WWII, RCN ships were fitted with "fighting lights". One e-mail source on the web made reference to the fact that fighting lights were used to send emergency messages on a broadcast basis to a group of vessels immediately preceding or during action. This use of coded visual communication maintained security and could be construed as a form of visual IFF. With directional light, the receiver would send a short flash on receipt of each word. With non-directional signalling this was not possible. Obviously the sender could not watch all the ships at once to see if they received the word just sent. It was assumed that the entire message

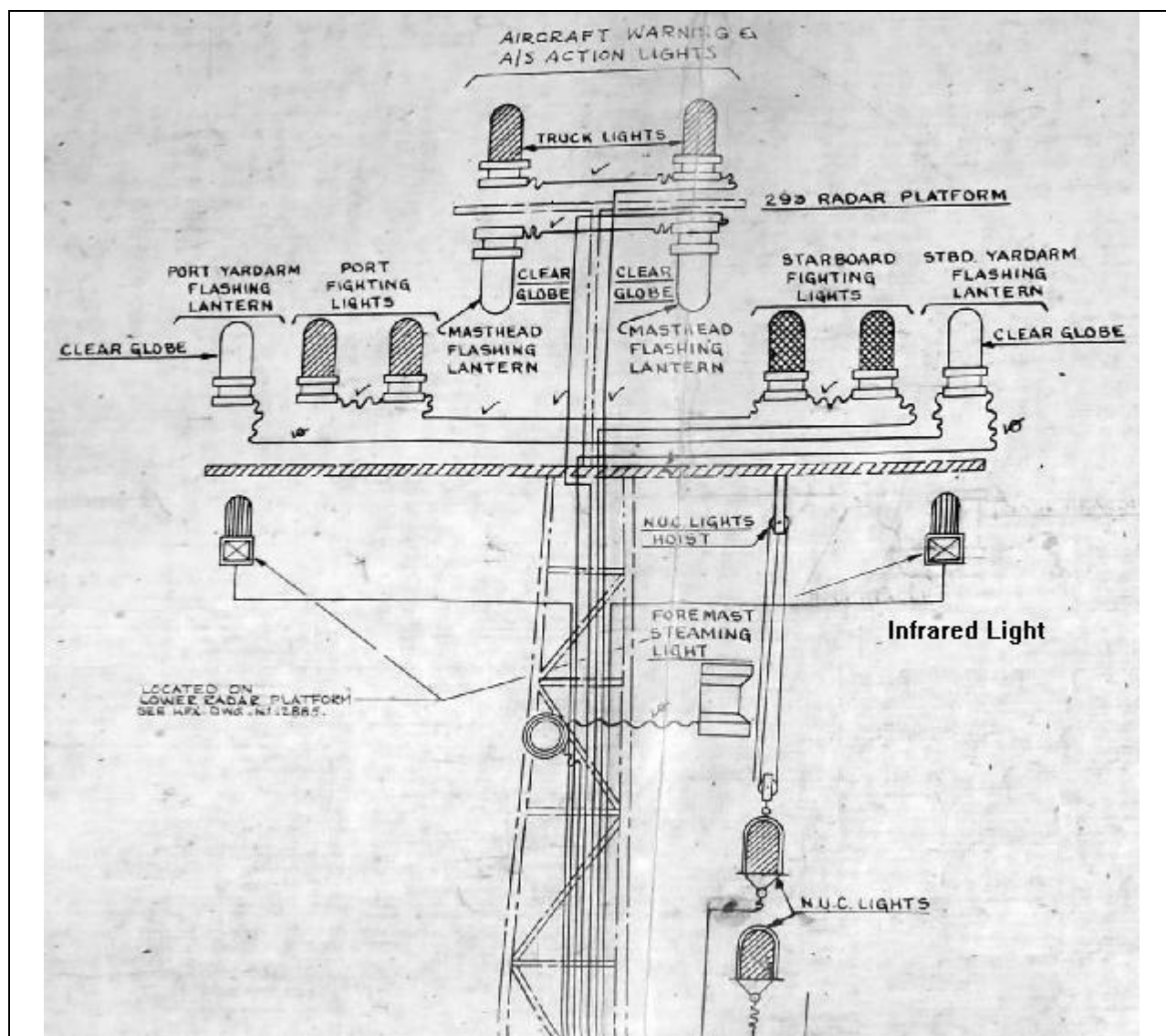
was received otherwise any (receiving) signalman could request a repetition. During routine operations, there were night exercises in which the yardarm or masthead lights were used to send Morse flashing exercises to the ships in company.

In the USN, infrared signalling was known in visual communications circles as "Nancy Hanks". (Nancy Hanks was the maiden name of President Abraham Lincoln's mother). An infrared viewer was necessary to view infrared transmissions. In the USN, a Nancy viewer scope was also used to check for "light leaks" during periods of darken ship. Very often it picked up the glow of light from a "leaking" scuttle or someone having a smoke on the weather decks. Infrared viewing scopes were quite amazing in that you could even turn them on a dim star on a clear night and see that star quite clearly! In the RCN, these lights were referred to as "Nancy".

Don Ross, a former Visual Signaller in the RCN comments on Nancy. "When an infrared signal was about to sent, the radio code words were *Nancy Hanks*. This was sent a few minutes in advance so the signalmen could get the infrared reading device out of storage and be ready to read the Morse code. We used it in training quite a few times, but the only time I ever used it for real signalling was on a trip into the Baltic Sea. We were being shadowed by a squadron of Russian (destroyer like) ships. St. Laurent's Captain (Senior Officer) used infrared to signal course and speed changes".



Signalling lights aboard HMCS HAIDA. 1- Truck lights for aircraft warning and anti-submarine action. 2 - Masthead Flashing Lanterns. 3 - Yardarm Flashing Lanterns. 4 - Fighting Lights. 5 - Infrared lights. (Photo by Jerry Proc)



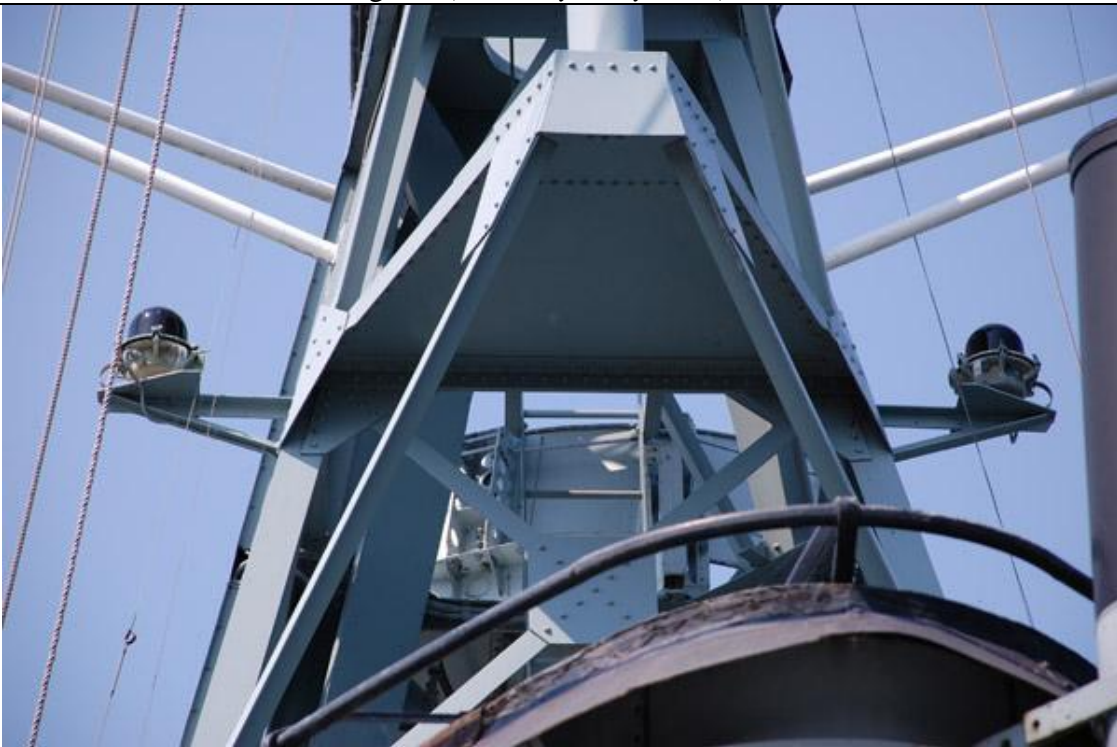
This is a partial schematic diagram of the flashing light system. Both port and starboard light sets (ie fighting, masthead and yardarm) were connected in parallel and keyed as a group except for the infrared lamps which were keyed with separate Morse keys. The NUC lights are described elsewhere in this document. (Image courtesy RCN)



In 2007 this flashing light control station aboard HMCS HAIDA was restored after being under a metal cover for several decades. In addition, three other similar stations could also control the flashing lights. One identical pair was on either side of the bridge and slightly aft. The other pair of stations were on the port and starboard sides of the flag deck. Normally a curved, hinged metal cover would protect the keys from the elements. A typical signalling speed for flashing lights would be around 13 wpm. *(Photo by Jerry Proc)*



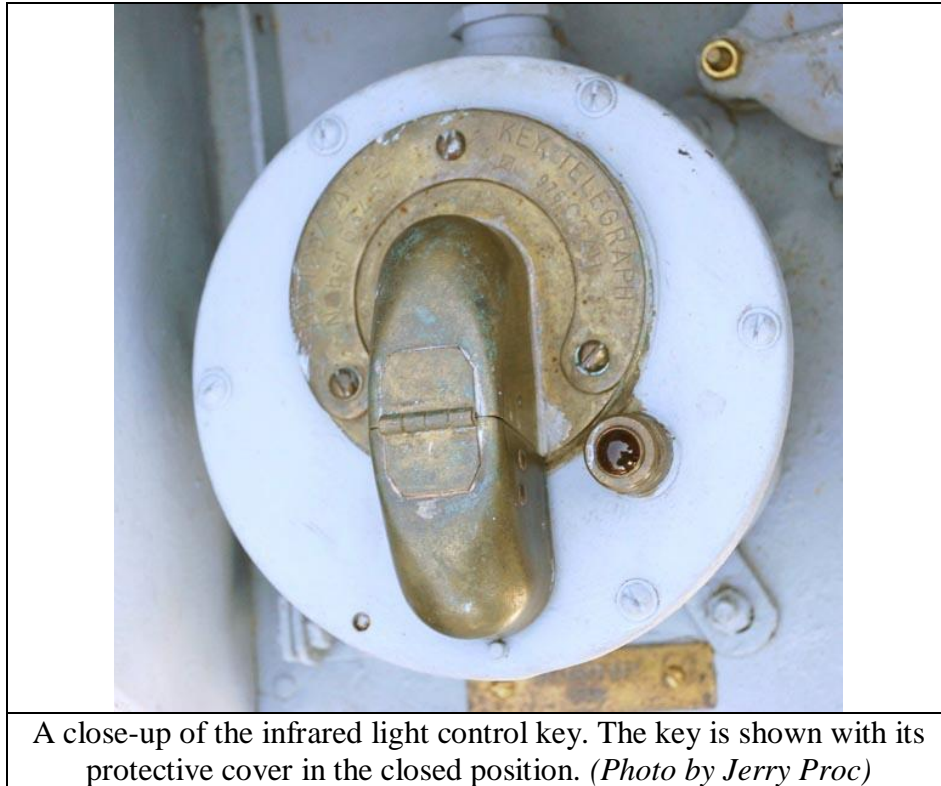
Close-up of the flashing masthead lights attached to the 293 platform. The truck lights atop the shade cannot be seen from this angle. *(Photo by Jerry Proc)*



Two infrared lights are fitted on each side of the lattice mast just below the yardarm. *(Photo by Jerry Proc)*



Close-up of an infrared lamp. Keith Kennedy also confirms that infrared signalling was referred to as "Nancy" in the RCN. Sometimes a reddish coloured infrared filter would be placed over the 10 inch signal projector for infrared signalling but it resulted in a reduction in the size of the beam. Infrared signalling was sometimes referred to as "dark light" signalling. (*Photo by Jerry Proc*)



3.3 SIGNAL PROJECTORS (SP's)

Most ships used 10 inch signal projectors but on smaller vessels, hand-held Aldis lamps were used. Larger ships like destroyers also had two 20" SP's on mountings either side of the bridge and slightly below it. SP's were used to communicate with other ships in Morse code and were also known as Signalling Lanterns in the RCN.

10 INCH SIGNAL PROJECTOR

The 10" signal projector operates with a light beam divergence of six degrees and 1 million candlepower output. In bright sunlight, a range of 10 miles can be expected. For night signalling the projector's light output can be attenuated by the use of filters which either lessen the brilliancy or convert the light to infra-red. This projector is still in use by the Canadian Navy in 2007 and is carried on Iroquois Class, Kingston class and a couple of Halifax class frigates but not HMCS Toronto.

With directional signalling, the operator sends at the speed of the slowest reader. There is an acknowledgment flash from the reader after every word. Repetition of words is quite common. The NATO standard sending speed remains at 8 WPM.

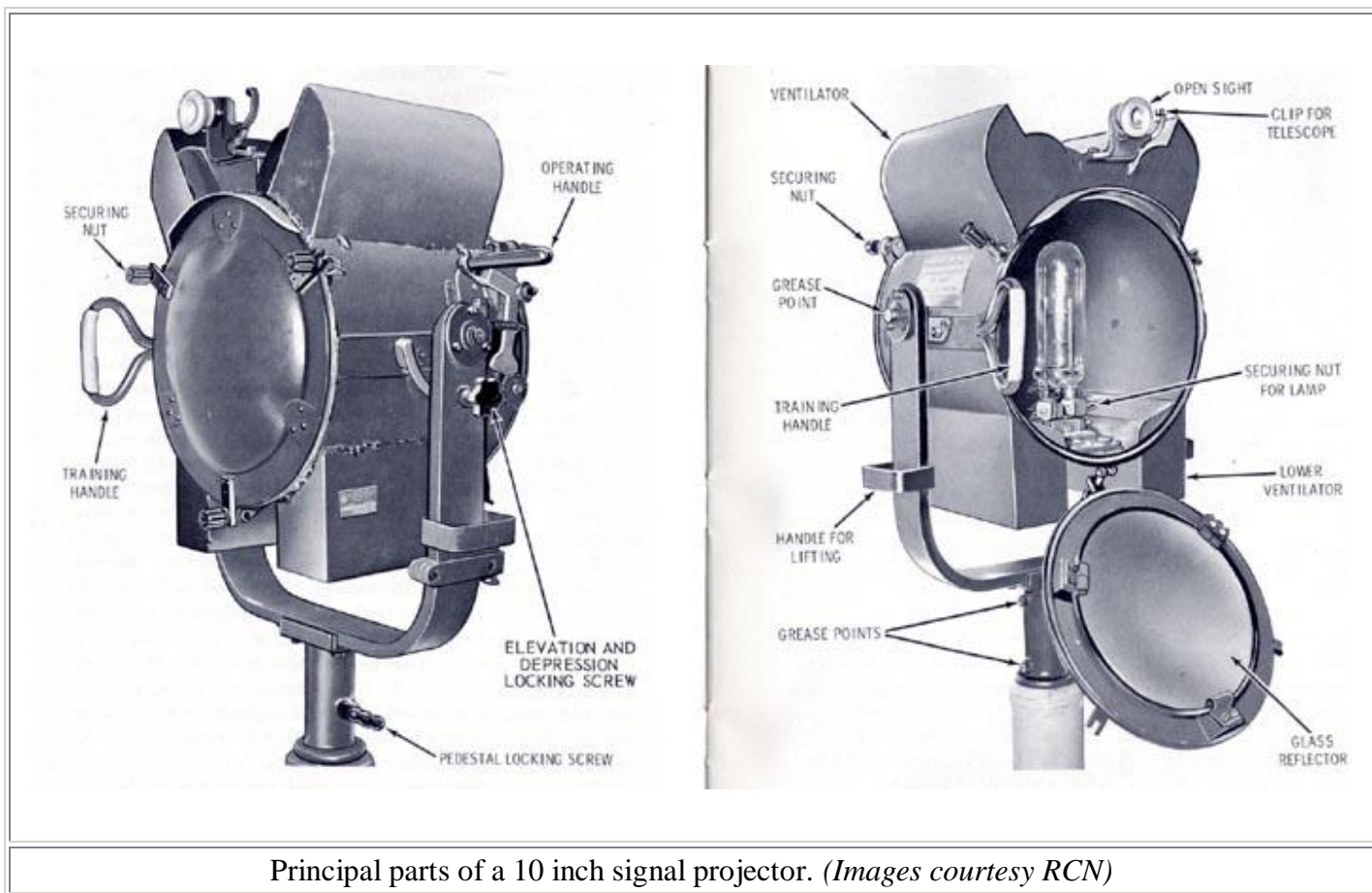


This 10 inch signal projector on HMCS HAIDA's starboard size uses a 1000 watt filament-type lamp. It does not use a blower motor to exhaust hot air. *(Photo by Jerry Proc)*

Nameplate data: Pattern 3860A; Serial 5676; Year: 1944; Made by: General Electric, Toronto. It is not known if this particular projector was original to the ship since there was little chance that Vickers-Armstrong (HAIDA's builder) would use an overseas subcontractor during wartime.



Radio collector Richard Dillman is demonstrating a signal projector aboard the S.S. Lane Victory. The size of the projector is believed to be around 10 inches. (*Photo via Richard Dillman*)



12 INCH SIGNAL PROJECTOR

The 12 inch signal projector, the same type as used by the United States Navy, was introduced into the Canadian Navy fleet in approximately 1981. Confirmation has been received that HMCS ALGONQUIN 283 had them by January 1982. In 2007, the Canadian Navy fleet has approximately a 50/50 mixture of 10 and 12 inch signal projectors. The primary signal projector on Halifax and Iroquois classes is the 12" size.

20 INCH SIGNAL PROJECTOR

These projectors used a carbon arc light source. Each pair of carbon rods lasts approximately 50 minutes. When used as a searchlight, the lamp is focused so the beam is narrow, having a divergence of 2.6 degrees and a minimum brilliance of 45 million candlepower.

When used as a signalling projector, the beam's divergence is increased to 4.5 degrees thus giving a brilliance level in the order of 10 million candlepower. A broader beam was more desirable for directional signalling because it shows up on the horizon as a "splash" of light which is much easier to see than a pinpoint of light.

Banging one's hand on the shutter handle would not ensure faster signalling. The projector had to be operated with light pressure of the fingers. Special attention had to be paid to the spacing of the dots and dashes to ensure that the Morse code was readable. While signalling, one eye had to be constantly in the sight so as to compensate for ship's own motion and maintain a visual lock on the other ship. Twenty inch signal projectors used by the USN used carbon rods about 12" to 15" long and had a diameter about the size of a pencil.

The use of the 20 inch signal projector was phased out by the Canadian Navy around 1985. It is believed that HMCS Athabaskan 282 was the last ship to use one.



Starboard side 20 inch signal projector aboard HMCS HAIDA Type 170A Mk IV. It could also double as a searchlight. *(Photo by Jerry Proc)*

Nameplate Data: Pattern 170A; Serial 1488; Year 1943; Made by Metropolitan Vickers.



This photo illustrates the internal components of the 20 inch signal projector. (*Photo by Jerry Proc*)

NAMEPLATE DATA : 20 inch Lamp Mark IV; Volts 67 Amps 85; Pattern No 173; Made by Canadian General Electric; Serial No 1347 Date 1945.



Closeup of the carbon arc elements which consume 5700 watts of power in this model. After the arc is flashed up, an internal motor rotates the carbon rods slowly and at the same time a ratchet mechanism pushes them forward to maintain a constant gap as the heat consumes the carbon. Without a drive mechanism for the carbon rods, it would be an impossibility for a signalman to keep the arc lit, train and elevate the light and operate the shutters while a ship was rolling and pitching! *(Photo by Jerry Proc)*



This 20 inch signal projector, fitted on HAIDA's port side, illustrates the shutter detail. It is not known if this projector was original to the ship. It's missing the blower assembly. No nameplate data is available at this time. Power from the ship's 220 volt DC mains was applied to three resistor boxes connected in series which would drop the voltage down to a safer level - around 67 volts. The projector was energized with a three pole connect/disconnect switch. As of 2007, signal projectors are still used by most of the world's navies including the Royal Navy and the United States Navy. *(Photo by Jerry Proc)*

3.4 SEARCH LIGHTS

Xenon search lights are now used for (night) Man Overboard situations and can also be used to illuminate a vessel being hailed. These were not available in the 1960's.

3.5 ALDIS SIGNALLING LANTERN

The RN first started using Aldis lanterns in the 1800's and the rest of the navies adapted this form of flashing light using Morse code. Royal Navy, RCN and USN versions of the Aldis were slightly different whereby the USN models used a shutter to key the light beam while those in the RCN and RN used a tilting mirror.

Those used in the RCN were hand-held projectors about 4 inches in diameter, which had a pistol grip and a trigger to control the light. Aldis lamps used either 12 volt or 36 volt bulbs to send messages in Morse code. When using the ship's low power mains in DC fitted ships and when using a portable battery, 12 volt lamps were used. The 36 volt bulbs were used in AC fitted ships. Along the top, there was a sight which was used to aim the lantern. The lantern was usually rested on the crook of one elbow, held shoulder high while the other two triggers were operated by the opposite hand. When using portable wet cell battery, the Signaller had to ensure it was kept charged when not in use.

The pistol grip is fitted with two triggers. The lower trigger turns on the lamp and must remain depressed for the duration of the message while the upper trigger tilts the mirror. When the lantern is accurately trained on the receiving station and even if the lamp is on, nothing will be seen until the beam is raised by pressing the upper trigger. Releasing the upper trigger drops the beam thus producing breaks between the dots and dashes of the Morse code characters. During darkness, colored filters could be attached to the lantern to reduce the lamp's brilliance.

The 5 inch Aldis lantern combines the features of the 4 inch Aldis lantern and the Intermediate Lanterns. It uses the same power supply but produces 150,000 candlepower. Coloured shades can be secured to the front glass to reduce the brilliancy for night signalling. HMCS HAIDA's electrical drawing shows places for two 6 inch Aldis lanterns both running at 22 VDC, however the Signaller Trade Group 1 Manual does not mention anything about 6 inch Aldis lanterns.

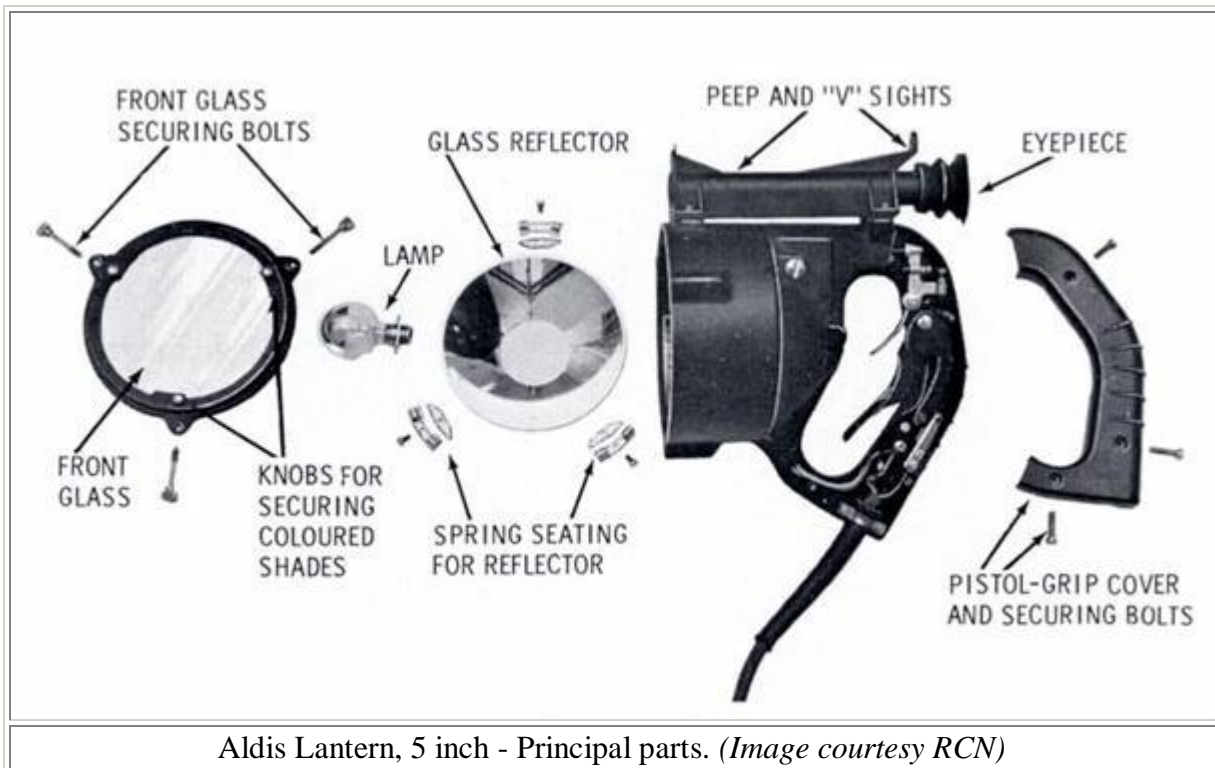
Don Wagner details USN usage of the Aldis. "In the USN, the Aldis lamp had a 6 inch diameter barrel with a pistol grip and a "trigger" to operate the lamp shutters. It was used by submarines on the surface and maritime Navy patrol aircraft to communicate with destroyers engaged in depth charging enemy subs. The lamp could be operated by plugging it into the ships power mains or into a portable battery pack. The Aldis was also used in small craft."

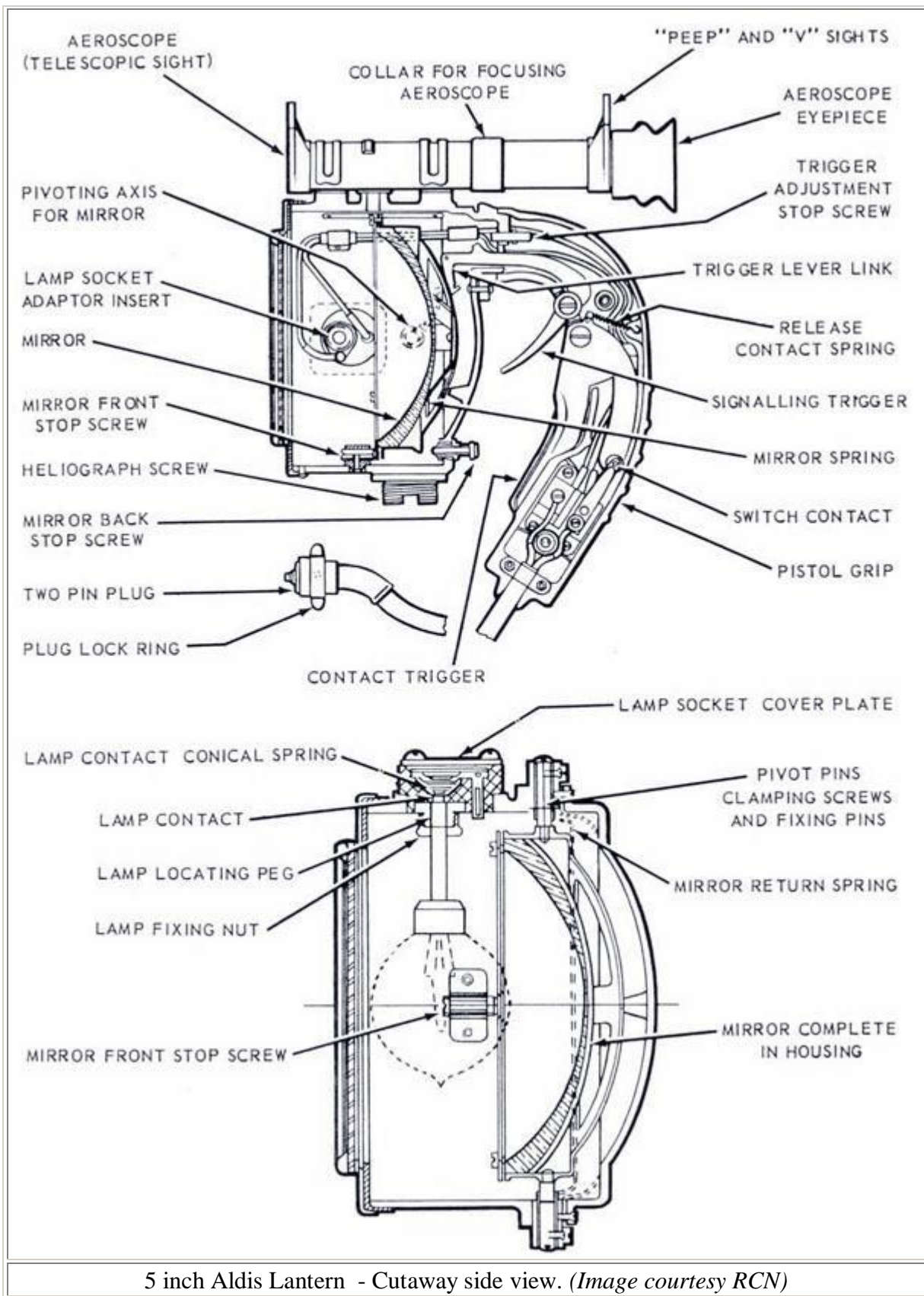
The Royal Navy phased out the use of Aldis lamps in 1997, although by that time they were largely ceremonial. Other modern forces have followed suit as technological advances in digital communications have made the device obsolete. HMCS Toronto still carries five Aldis lamps on the bridge for backup purposes.



Above and below: 4 inch Aldis lantern, pattern S5110E. Made by Sutton-Horsley Co. Ltd, of Toronto Ontario. This one was last used on HMCS Labrador. Since there was no battery compartment in the carrying case and the lamp has a long power cord, it is believed it was powered from the ship's low voltage power mains. Five inch Aldis lamps produce 150,000 candlepower. *(Photo by Jerry Proc)*







5 inch Aldis Lantern - Cutaway side view. (Image courtesy RCN)



WRENS practicing with the Aldis lamp likely at the training facility at St. Hyacinth. (*DND Imaging Centre photo # 209639-1*)

3.6 INTERMEDIATE LANTERN

The Intermediate Lantern produces 2 to 2000 candlepower depending upon the position of its control switch. When connected to a power source, the lamp illuminates continuously although this is not apparent unless the trigger is pressed. A sleeve of metal, which completely covers the lamp is attached to the trigger. Morse code is generated by covering and uncovering the lamp using the trigger. Since the lamp is normally covered by the metal sleeve, it is also very easy to forget that the light is on so the operator might store it while still switched on. Apart from potential damage caused by overheating and the attendant fire hazard, leaving the lamp switched on for extended periods of time required more frequent changes of the bulb.

A modernized version of this type of lantern is carried by HMC ships in 2007. HMCS Toronto still has two Intermediate Lanterns on the bridge for backup purposes.



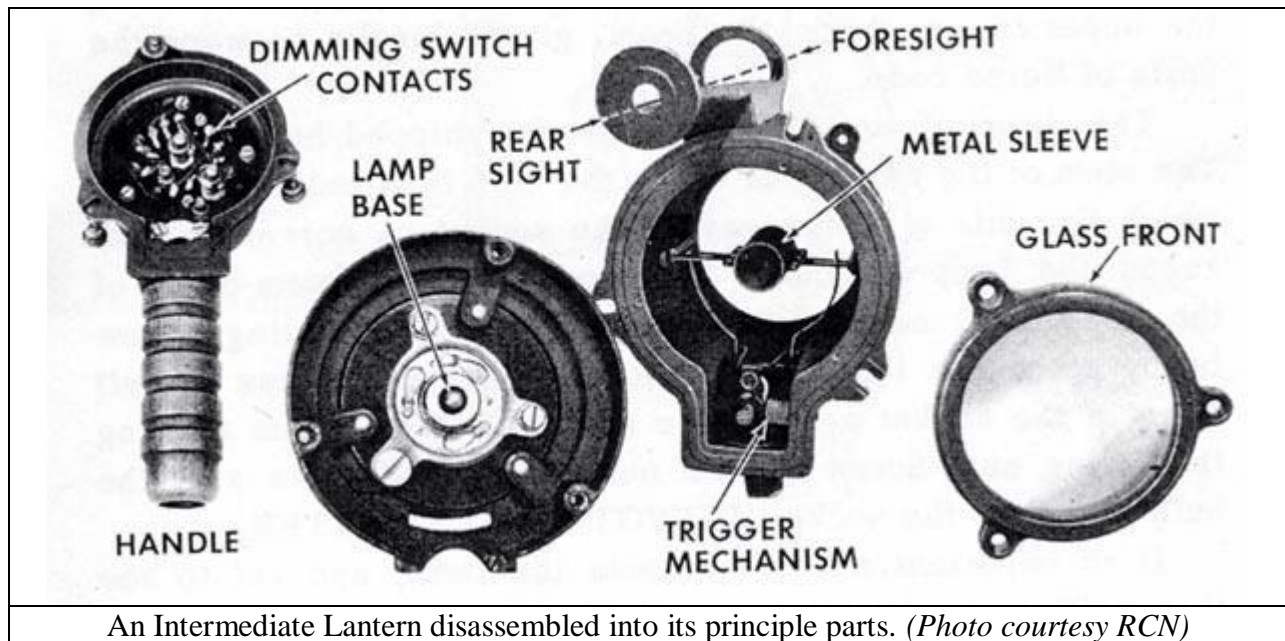
Intermediate Lantern - Front view. The black cylindrical object in front of the mirror is the shutter. It moves forward when the trigger is engaged thus allowing light to escape. (*Photo by Jerry Proc*)



Intermediate Lantern - Side view. Admiralty Pattern Number AP2174. (*Photo by Jerry Proc*)



Intermediate Lantern - Rear View. The control dial selected the power source (mains or battery) and the light intensity for each power source. *(Photo by Jerry Proc)*



An Intermediate Lantern disassembled into its principle parts. *(Photo courtesy RCN)*

3.7 DAYLIGHT SIGNALLING LANTERN

The Daylight Signalling lantern (DSL) was fitted in cruisers (ie HMC's Ontario and Uganda) and larger ships and mounted in pairs on the side of the mast, bridge or funnel. It was used for non-directional signalling during daylight. DSL had a horizontal divergence of 200 degrees and a vertical divergence of +/- 10 degrees. Its 25,000 candlepower output gave it a range of several miles.

Morse code was produced by the keying of an electric shutter fitted inside the lantern. The shutter could be keyed from several locations on the bridge or flag deck of the ship.

3.8 NUC LIGHTS, BLACK BALLS and DIAMONDS

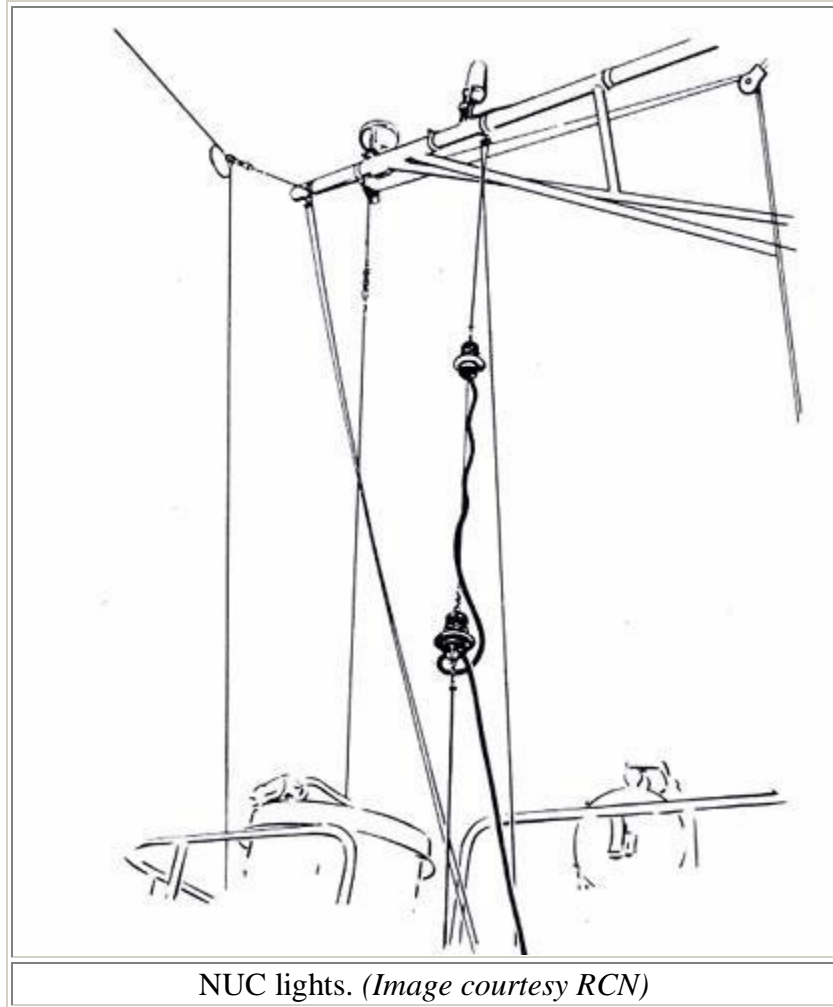
Not Under Command Lights

NUC lights are two red lights joined together by a six foot length of wire rope or halyard. The condition means that the ship cannot obey the "rules of the road" and all other ships must give her the right of way. These lights were hoisted on a signal halyard during the hours of darkness to indicate a breakdown or man overboard. They had to be ready for instant use between sunset and sunrise. During daytime, two black balls would be used to signal a NUC condition.

The Signalman of the Watch would test the lights to ensure they were working properly then he would hoist them on the yardarm. When in position, the Officer of The Watch was informed. When required, they were turned on and left on to indicate a breakdown or flashed to indicate man overboard.

Halifax class ships have red and white NUC lights built into the mast to inform other ships of any of the following states: NUC, RAM (Restricted in Ability to Manoeuvre), Man Overboard (MOB) or prosecuting a sonar contact. These light are not optional as they are mandated by the International Regulations for Preventing Collisions at sea (COL REGS).

Rule 3 of the Colregs provides this specific definition for a vessel not under command: The term "vessel not under command" means a vessel which through some exceptional circumstance, is unable to maneuver as required by these Rules and is therefore unable to keep out of the way of another vessel.



BLACK BALLS and DIAMONDS

Two black balls, separated by tackline could be used by day to indicate that a ship is Not Under Command. By night it was two vertical red lights. A vessel at anchor would hoist one black ball on the yardarm corresponding to the side on which her anchor is down. The anchor ball is hoisted when the anchor is dropped and is hauled down when the anchor is aweigh. Light on top of the jackstaff denotes anchored at night plus the running lights would be off.

Diamonds are also carried so a ship can inform other ships of its status. The pattern Blackball - Diamond- Blackball means - "Restricted in ability to maneuver".



Three blackballs means "I've run aground". Black balls are still carried aboard HMC ships in 2007 since the carrying of shapes is also mandated by COL REGS.



This is a canvas black ball, the type used by the RCN in the 1960's. This example aboard HMCS HAIDA is in a near petrified state after having been stored outdoors for several decades until it was discovered in 2002. Handled with care for the photo shoot, it cannot deploy to its fully open position. Normally the top would be peaked like the bottom. *(Photo by Jerry Proc)*



Here's how two black balls looked when secured with regulation length tackline. The bottom one is in a fairly deteriorated state. *(Photo by Jerry Proc)*

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|---|--|
|  |  |
| <p>Commercial marine black ball. <i>(Image courtesy Thomas Gunn Services)</i></p> | <p>Commercial marine diamond. <i>(Image courtesy Thomas Gunn Services)</i></p> |

3.9 OPERATIONAL ASPECTS OF LIGHT SIGNALLING

The choice of which lantern or projector to use was generally left to the operator's discretion. His choice would have been based on several factors some of which are: distance, amount of daylight, sea state, presence of other ships and background. Signalling at dusk and dawn was kept to a minimum as this is a critical period when the ship's position could easily be betrayed to an adversary by the display of lights. There was a requirement to use a minimum amount of light for message transmission, hence the operator may have to change from one piece of equipment to another as circumstances dictate.

It was also possible to reduce the brilliancy of a lantern after communications were established. If the light output from a sending ship was too brilliant, the receiving ship would send a series of 'D' characters until the sending ship reduced the brilliancy of its light.

The special abbreviation OL was used to tell the receiving station to show a steady dim light. This was done at night when using small directional flashing lanterns which must be accurately trained in order to be seen. If reception became difficult owing to a badly aimed or poor light, the receiving station was expected to flash a series of 'W' characters whereupon the sender was expected to direct a steady beam of light until the letter 'K' (meaning proceed) was received. For signalling to one station only, a directional lantern was generally used.

Directional procedure is a method which requires each group (word, prosign, code group, or operating signal) to be acknowledged by a flash from the receiving station before the next group is transmitted. Should the receiving station miss a group, it was repeated by the transmitter as often as necessary until a flash was received.

Now... fast forward to 2007 and a comment from a current serving NAV COMM describing his Halifax class ship. "We have two yardarm blinkers, one at each end. Keying boxes for the light are found on the bridge and on the bridge wings. Yardarm blinkers are used for Non-directional light sending of a large message. Non-directional protocol is complicated and few if any navies

use them as a method of sending signals. Generally, messages are sent via teletype or satellite. Visual Comms is used for short tactical signals or operator to operator short messages. Directional signalling with lanterns is far superior and less prone to error".

3.10 MODERN INTERMEDIATE LANTERN

The primary small signaling lantern in the Canadian Navy circa 2007 is the Wiska Richtblinker RBL available from Rainer Förtig Elektronik . It is a plastic, battery operated signaling gun with interchangeable colour filters. In the Canadian Navy, it's referred to as the Wiska lantern.



Powered by battery, the Wiska Richtblinker RBL has a 70 mm wide lens and a focal length of 30 mm. It uses a 4 V, 0.75 amp projection lamp and weighs about 1.0 kg. *(Photo courtesy Rainer Förtig Elektronik)*

3.11 TRAINING

John MacFarlane recalls his training at Cornwallis. " I remember that Morse visual training was conducted with a lamp for the first year UNTD cadets at Cornwallis. A projector was mounted on the outside of the second floor of the H-hut which housed the Gunroom and classrooms. Cadets would stand in the courtyard – one with a clipboard with back turned to the lamp and the other softly calling out the letters or numbers which were duly recorded. All cadets had to qualify regardless of the number of attempts necessary to pass. The speed was probably 5 wpm – which was easy for me but perplexed many of my colleagues.

Once I passed the test on the first try, I was delegated to transcribe for all the other testers. Typically some of them ‘just didn’t get it’ so I would stand so that I could see the lamp reflected in a window. Of course the copy is same either way so I simply recorded the message and passed numerous shipmates who would never have passed otherwise. That was good for rounds of beer in the Gunroom and elevated my popularity. Eventually the instructors began to suspect me – and I was forced to move to another location which put me out of business. I know, I should be ashamed but it still brings a chuckle!

We were not required to send – but I was employed in Gate Vessels as a Cadet visual communicator and got practice at sea sending and receiving which I enjoyed thoroughly. The lamp however hobbled me in learning to send CW on radio and it took some time to “forget” the visual decoding mental process! In our Second Year training, we did no more visual signalling. It was all voice procedure and fleet manoeuvres which was not as much fun".

4.0 SEMAPHORE , PYROTECHNICS, PUBLICATIONS and OTHER

4.1 SEMAPHORE

This method of signaling is an old favorite of the Navy because it is the fastest way of sending messages by flags and is even faster than flashing light. It can be used only in the daytime and at distances of less than 2 miles. It is even more secure than light signalling because there is less chance of interception by an adversary.

Semaphore requires little equipment - just hand flags either 15 or 18 inches square. Letters and numerals are formed by placing two flags at certain angles to each other. Each flag is held so that the staff is a continuation of the signaler's forearm. The arms need to be kept stiff.

The simplest method of memorizing the characters is to treat them as a series of circles. Please refer to the semaphore chart for the flag positions. The arms move in a manner akin to the minutes and hours hands on a clock. The letter A starts at around 06:40. There is no rule about which arm is to be used when forming each character. The sender can use whichever arm is convenient.

1st circle: A to G (single arm signals)

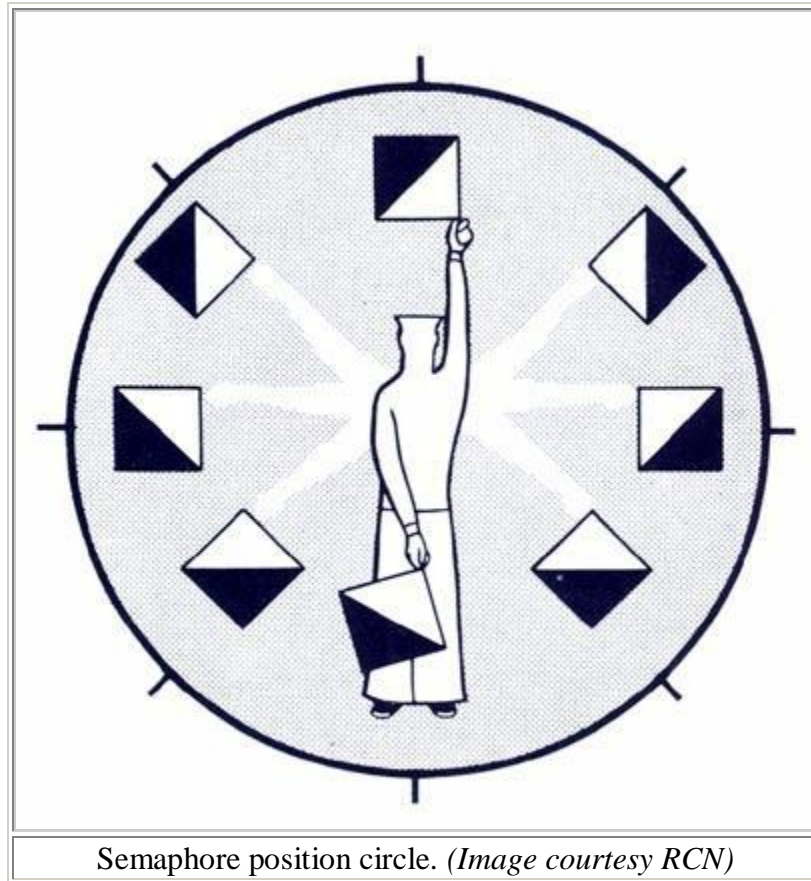
2nd circle: H to N (omitting J)

3rd circle : O to S

4th circle : T, U and Y

5th circle : Numeral Sign, J and V

To complete: W, X and Z

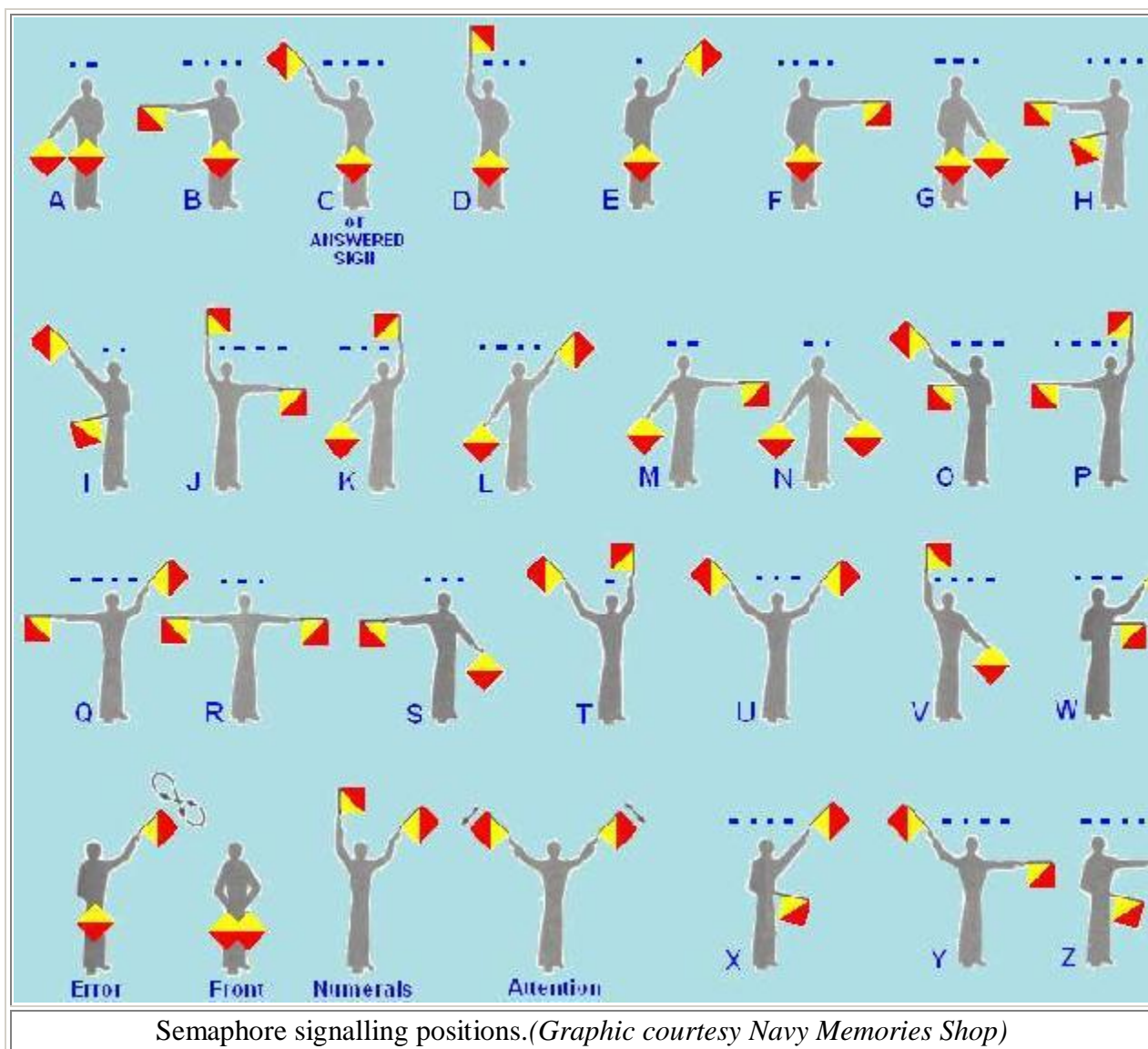


Here is a procedure to send a semaphore message. First, get the receiver's attention with the Attention signal, made by waving both flags repeatedly overhead in a scissor-like motion. When the receiver sends the letter K, you can go ahead.

Send the letters of each word by going directly from the position of one letter, without stopping, into the position of the next, pausing in each. If you have to think of the next letter, hold the letter you are making until the next one comes to mind.

To indicate the end of a word, give the front signal by bringing the flags down in front of you, with the staffs crossing each other. Whenever double letters appear in a word, use the front signal to separate them. Make the first letter, then front, and immediately, without pause, bring the flags again in position of the letter.

The receiver acknowledges each word by sending C. If he or she suddenly sends I-M-I, it means that he or she did not catch your last word. Repeat it and continue from there. If you have made an error yourself, send eight Es and start again from the beginning of that word. Finish the message with A-R and wait for the receiver to make the letter R. This means the receiver has your message.



Semaphore is still used and is still taught at the RCN Fleet School. The NATO sending standard for Naval Communicators is 15 words per minute but it is rarely used as a means of official communication. Semaphore is most often used during replenishment at sea or as an unofficial chat line to converse with another ship. Many times the exchange of gifts or souvenirs between two ships were arranged via semaphore.



WREN sending the letter 'H' likely at the training facility at St. Hyacinth. (DND Imaging Centre photo # 209239-1)

4.2 PYROTECHNICS

Fireworks , flames and smoke are normally used as a means of communication only in emergency. In the 1950's and 60's period, the night signal box kept on or near the bridge, contained 3 signal rockets, 1 tin of friction tubes, 1 pistol, 2 short lights and 18 one-inch signal cartridges. There were 6 cartridges in each colour of red, white and green.

Rockets could be fired from a launcher. Firing a rocket was a signal for "man overboard" or other emergencies. Signal cartridges could be fired from a special pistol. This was used for signalling at night and at limited distances by day. When the cartridge is fired, a star shoots into the air. As it falls it burns with a red white or green colour. In the dark, cartridges could be easily identified by feeling the rim at the base of the cartridge. Red was milled. Green was plain. White was half milled. The signals that could be made with pyrotechnics are found in publication ACP 168.

Pyrotechnics are still carried by HMC ships in 2007 because they are mandated by COL REG (International Regulations for Preventing Collisions At Sea) as well as the International Code of Signals (INTERCO) and other military publications. Many different types of pyro are carried onboard and it is stored on the bridge locked up. The key is taken from the Officer of the Watch

during certain evolutions (repetitive functions) by a NAV COMM. Also carried are Very pistol flares with a flare pistol in red, yellow and green along with para-flares and red flares.



This photo, taken on the bridge of HMCS HAIDA in the late 1940's, shows the position of the port side Schermuly signal rocket launcher. Signal rockets would be fitted into the tubes when going to sea and stowed when in harbour. The rocket would only be fired in an emergency using a Copper Friction tube that was fitted in a small opening with a breech closing to keep it in place. This duty was normally performed by the Gunners Yeoman as opposed to a "bunting tosser" Yeoman. *(Photo courtesy HMCS HAIDA Archives)*

William Schermuly, seaman, inventor, reformer was born in 1857 and developed many simple, small, yet successful life saving devices for ships at sea mainly centered on pyrotechnics. In 1926, he set up his own factory in Cheam UK. As business grew, more operating capital was needed. Together with financier H.A. Thompson, Pistol Apparatus Ltd was borne. Today the Schermuly name lives on as part of Pains-Wessex, a world known manufacturer of marine signals and military pyrotechnics.


4.3 PUBLICATIONS RELATING TO VISUAL SIGNALLING



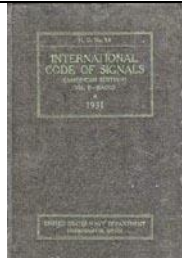
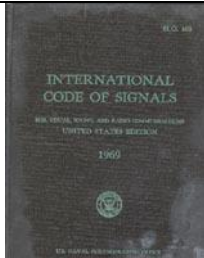
4.4 CIVIL PUBLICATIONS

Various maritime nations published International Code of Signals books. Shown here are the US and UK covers from various periods. It is believed that the US 1969 was the last revision. There is no evidence to suggest otherwise. The International Code of Signals was very cumbersome and hard to use during World War I as evidenced by the 600 pages in the 1899 edition!

INDICATIFS D'APPEL

Years ago, when a naval ship entered a foreign, or a Canadian non-naval port, pendant numbers on the flag hoist would mean nothing to the Port Authority or pilot station. However, flying a radio call sign would provide immediate identification as they could reference a listing in an international publication known as *Indicatifs D'Appel*. In English, the book is titled "List of Call Signs and Numerical Identities (of stations used by the maritime mobile and marine mobile-satellite service). Published by the International Telecommunications Union in Geneva Switzerland, it identifies stations based on their radio call signs. In the RCN, the book became affectionately known as *Green Apples* as a result of its light green coloured cover and that 'Appel' sounds like 'Apples' in English. Surprisingly, Canadian warships have not been listed since the 1959 issue.

| | |
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|  | <p>This is the cover of the 1987 issue of <i>Indicatifs D'Appel</i>. It has 419 pages of detailed listings. All merchant ships are listed but a few nations do not list their government ships. In 2007, <i>Green Apples</i> is no longer available under that title. It is now one of the ACP's. (Image courtesy of Spud Roscoe)</p> |
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|---|---|
|  |  |
| UK 1899 | UK 1969 |
|  |  |
| US 1931 | US 1939 |

The 1931 US issue is nearly twice the size of the 1969 issue. (*All images courtesy Spud Roscoe*)

4.5 MILITARY PUBLICATIONS

ACP(s) - Allied Communications Publication(s)

The Signalman Trade Group Manual BRCN 3038 lists numerous publications used in naval communications. The data shown below is valid for the 1963 period.

DEFINITIONS

INTRA - This group includes those publications which are issued by the RCN for its own use only.

JOINT - Publications issued for use between two or more services of the same country (ie Army , Navy Air Force)

COMBINED - These publications are issued for use between two or more countries.

This is a list of abbreviations used in the "Short Titles" of Communications Publications.

| | |
|-------|---|
| ACP | Allied Communication Publication |
| AFSAG | Armed Forces Security Agency (General) |
| AFSAK | Armed Forces Security Agency (Key List) |
| AFSAL | Armed Forces Security Agency (List) |
| AFSAM | Armed Forces Security Agency (Material) |
| AFO | Admiralty Fleet Order |
| ALRS | Admiralty List of Radio Stations |
| AMSP | Allied Military Security Publication |

| | |
|--------|--|
| ATP | Allied Tactical Publication |
| AXP | Allied Exercise Publication |
| BR | Book of Reference |
| BRCN | Book of Reference Canadian Navy |
| CB | Confidential Book |
| CBCN | Confidential Book Canadian Navy |
| CGO | Confidential General Order |
| CSPM | Confidential Security Publication Memorandum |
| DNC | Director of Naval Communications (USN) |
| GO | General Order |
| JANAP | Joint Army Navy Air Force Publication |
| NACSIM | NATO Communication Security Information Memorandum |
| NCCP | NATO Commander's Communication Publication |
| QRCN | Queen's Regulations and Orders for the Royal Canadian Navy |
| SP | Signal Publication. |

Adding a number to the above abbreviation denotes a specific publication

CALL SIGN PUBLICATIONS

The following are some of the more common publications that a Signalman would encounter.

| | |
|-----------|---|
| ACP 100 | Allied Call Sign and Address |
| ACP 110 | Tactical Call Signs |
| ACP 112 | Task Organization Call Signs |
| ACP 113 | Call Sign Book for Ships |
| ACP 118 | Visual Call Signs |
| BRCN 1202 | List of Ship Stations (International) |
| BRCN 1206 | Alphabetical List of Call Signs (International) |
| BRCN 1208 | Signal Letters of British Ships (International) |
| JANAP 117 | Joint Routing Indicator Book |
| JANAP 119 | Voice Call Signs |

COMMUNICATION INSTRUCTIONS and PROCEDURES

| | |
|---------|--|
| ACP 121 | Communications Instructions, General |
| ACP 122 | Communications Instructions, Security |
| ACP 124 | Radio Telegraph Procedure |
| ACP 125 | Radio Telephone Procedure |
| ACP 126 | Teletype Procedure |
| ACP 127 | Tape Relay Procedure |
| ACP 129 | Visual Signalling Procedure |
| ACP 130 | Direction Finding Procedure |
| ACP 135 | Distress and Rescue Procedure |
| ACP 150 | Recognition Instructions |
| ACP 167 | Glossary of Communication-Electronic Terms |
| ACP 176 | Allied Naval Communication Instructions |
| AXP 3 | Allied Naval Communication Exercises |
| NDCSI | National Defence Communication System Instructions |

CODE PUBLICATIONS

| | |
|---------|--|
| ACP 131 | Operating Signals |
| ACP 148 | Wartime Instructions for Merchant Ships (Visual) |

ACP 165 Operational Brevity Code
ACP 168 Pyrotechnic Signals
ATP 1 Vol II Allied Naval Signal Book (ANSB)
BR 98 Minor Landing Craft and Boats Signal Book
BRCN 1216(I) International Code of Signals (Visual)
BRCN 1216 (II) International Code of Signals (Radio)

TACTICAL PUBLICATIONS

ATP 1 Vol I Allied Naval and Manoeuvring Instructions
ATP 3 Anti-Submarine Evasive Steering
ATP 16 Replenishment At Sea
ATP 19 Allied Minesweeping Manoeuvring Instructions

MISCELLANEOUS PUBLICATIONS

1. AMERICAN

DNC27 United States Naval Flags and Pennants
JANAP 195 Basic Armed Forces Communication Plan (BAFCOM)

2. CANADIAN

BRCN 109 RCN Publications Manual
BRCN 1215 Brown's Flags and Funnels
BRCN 1228 Yacht Flags and Ensigns
CBCN 5101 RCN Security Manual

3. BRITISH

BR 20 Flags of All Nations
BR 1971 Visual Signalling and Equipment Handbook

Admiralty Fleet orders (AFO) "S" Series:

S1/60 Royal Navy Communication Instruction
S2/61 Message Handling Instructions
S3/62 Commonwealth Naval Command Communication Organization
S7/61 Commonwealth Naval Ship-Shore Organization

In 2007, ACP's are distributed on CD-ROM. On Halifax class ships, they are printed out as needed and supplied to the bridge where they do not have access to a laptop computer. There are also many country specific publications which detail the local methods of communication.

ORDERS

Command orders were promulgated by senior officers to cover local requirements. They supplemented instructions contained in publications by supplying specific details for existing requirements. The more common orders of this type which were applicable to a Signalman were:

LANTCOMO (Atlantic Command Communication Orders) - These orders were issued by CANFLAGANT and governed local communications in the Atlantic area. They contained such orders as watches to be kept in Halifax and other East Coast ports, local call signs, addresses of standard type messages, and radio organizations.

PACOM (Pacific Command Communication Orders) - Same as LANTCOMO except they were applicable to the Pacific Command.

SQUADRON COMMUNICATIONS ORDERS - These orders were issued by Squadron Commanders and applied to their individual squadrons only. They contained such instructions as when to make routine reports, signals used only within the squadron, guardship assignments etc...

LOCAL ORDERS - Were issued by the Senior Officers of foreign ports and were available to ships visiting those ports. They contained information similar to that of LANTCOMO and PACOM.

OPERATION ORDERS - Operations and exercises involving ships have specific requirements that are promulgated by the Senior Officer of the ships which are participating in same. They contained the communication orders necessary for the ships and usually included frequency plans, publications to be used, reports required, manoeuvring instructions etc...

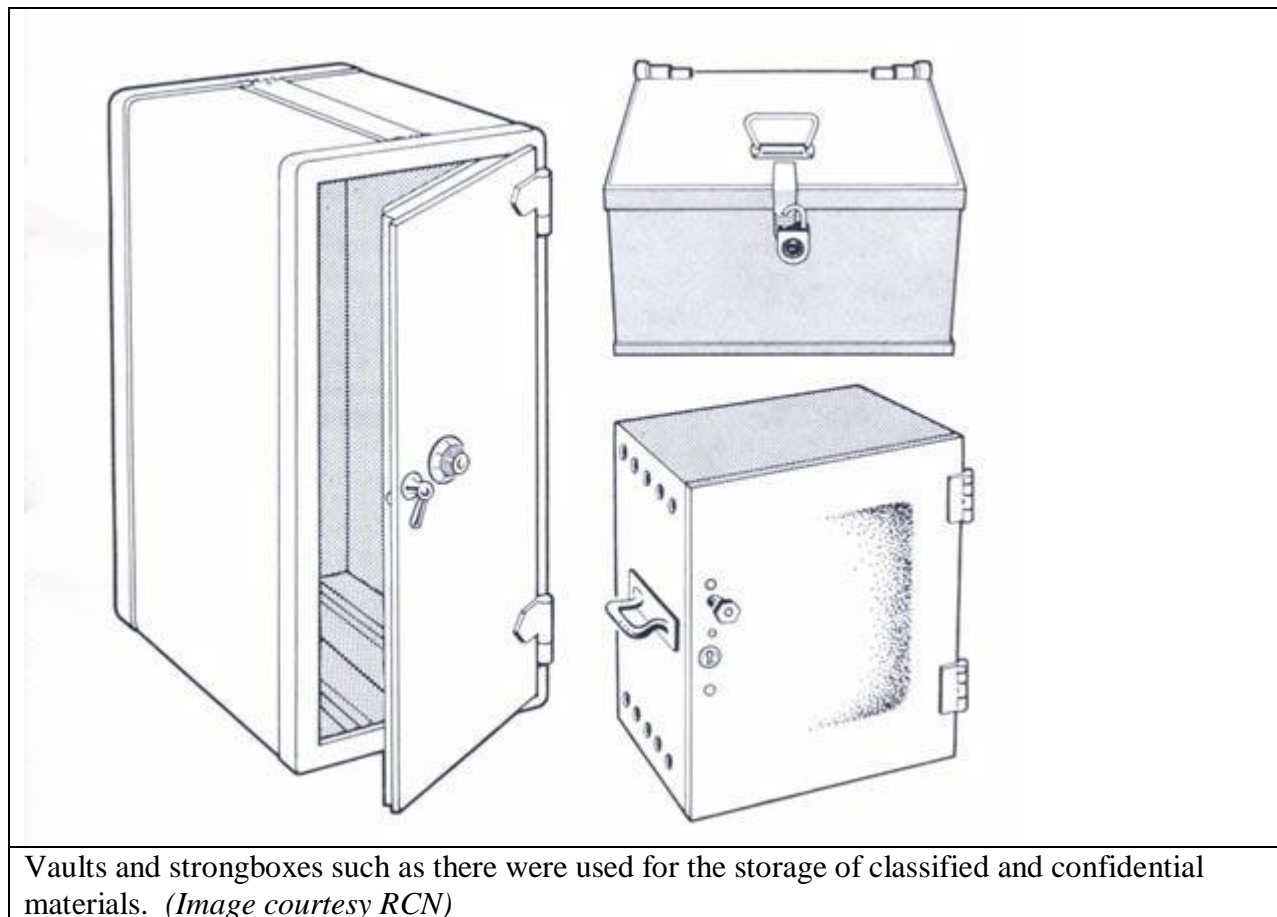
These orders were promulgated sufficiently in advance of an operation or exercise to allow the personnel concerned to become familiar with them.

PORT INFORMATION

Bob Willson details port information provided by the RCN. "Every naval port you entered had a set of "Port Orders". In Halifax it was ACSO's - Atlantic Command Standing Orders - and these would probably specify which side your radio call sign was to be hoisted. At one time we also hoisted the number of our destination berth on the opposite halyard from the call sign.

When you sailed from Halifax, you always took on board, the orders for the ports you were going to. In addition, we carried a "Port Information Book" which had numerous details about ports around the world, filed by ships that had previously visited. As well as official information about customs, protocol, and *administrivia*, they contained useful tidbits about the local "attractions" and suggested places that should be "out of bounds."

OTHER EXHIBITS



Vaults and strongboxes such as there were used for the storage of classified and confidential materials. *(Image courtesy RCN)*

MESSAGE FORM

FILE NUMBER

FOR COMMERCIAL USE

PRIORITY - ACTION

PRIORITY - INFO

DATE - TIME GROUP

DEFERRED

MESSAGE INSTRUCTIONS

FROM

TO

INFO

PREFIX

GR

SECURITY CLASSIFICATION

ORIGINATOR NUMBER

PAGE OF PAGES

REFERS TO MESSAGE

DRAFTER'S NAME

OFFICE

TEL.

CLASSIFIED

YES

NO

FOR OFFICE USE

DATE

SYSTEM

OPERATOR

DATE

TIME

SYSTEM

OPERATOR

RELEASING OFFICER'S SIGNATURE

CAFR 1710 USE: REV 9/58

CNS 1320 A (REV 9/58)

RCAP R43 (REV 9/58)

VS30 - 21 - 562 - 1556

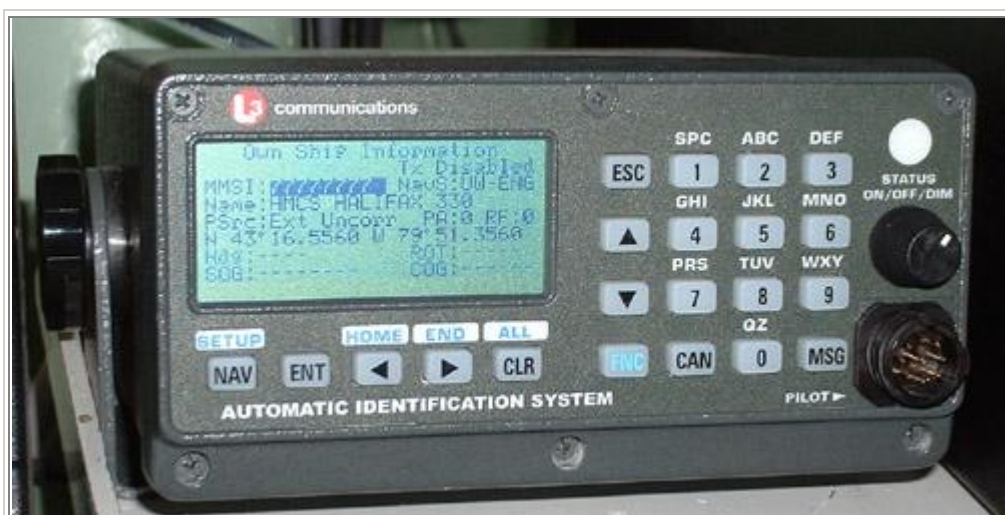
COPY 1

Naval message form circa 1958. (Image courtesy RCN)

4.6 NEWEST TOOLS FOR THE VISUAL SIGNALER

Today, there are a few extra tools available to the Signaller which were not around in the 1960's. Basically not much has changed in 50 years. Some of these tools include computers, newer small signalling lanterns, Big Eyes (huge binoculars), Xenon searchlights used for night *Man Overboards* and vessel illumination when being hailed. Modern VHF radios are now used to hail other ships, not flag hoists. Both naval and merchant ships fitted with the Automatic Identification System (AIS) broadcast their name by radio so it is not necessary to contact them visually.

AIS

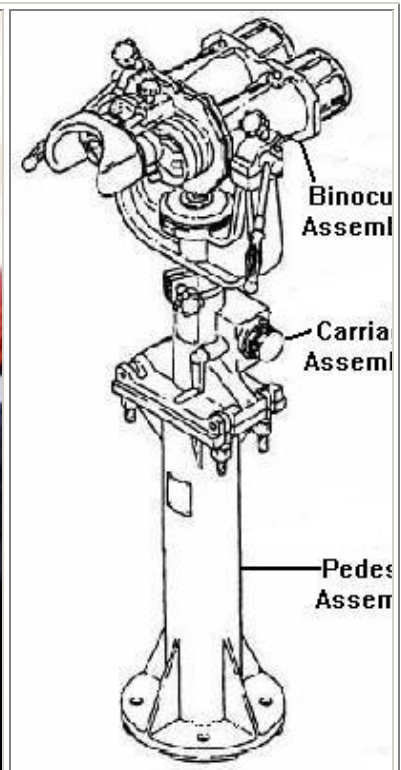


The Automatic Identification System (AIS) made by L-3 Communications is a collision avoidance tool, mandated by IMO SOLAS (International Maritime Organization, International Convention for the Safety of Life at Sea), to improve the situational awareness of the bridge crew while facilitating communication between vessels. It also has a built-in GPS receiver. In this case, the ship is broadcasting its name "HMCS Halifax 330". Other ships similarly equipped will also broadcast their name and it will show up in the display. Note the coordinates of N 43° 16.5560, W 79° 51.3560 are the western portion of Pier 9 in Hamilton. The photo was taken on May 4/07 when HMCS Halifax was berthed Hamilton during a Great Lakes tour.
(Photo by Jerry Proc)

BIG EYE

Binoculars have always been part of the Signaller's kit. Starting with the simple telescope in the days of sail, optical technology has made great strides over time. Today, HMC ships are fitted with high performance binoculars called Big Eye (20x120). The left most number signifies a magnification of 20 times while the right most number is the diameter of the objective lens in millimeters. It has an *apparent* field-of-view of approximately 70 degrees.

The binocular is mounted on a height adjustable carriage assembly which itself is adjustable through 70 degrees elevation ranging from -10 degrees depression to +60 degrees elevation with reference to the horizon. It is free to rotate through 360 degrees in azimuth. Variable density polarizing filters may be introduced into the optical path to reduce glare. Optical elements are anti-reflective coated to increase light transmission. Visors are provided on each barrel and may be extended to minimize reflections on the objective lenses. The most current model (in 2007) is the Mark III, Mod 5.



Big Eye in action. The binocular assembly weights 22.7 Kg; carriage assembly is 39.5 Kg; Pedestal assembly is 26.3 Kg. (DND photo)

Principal parts of Big Eye. (Image courtesy of Tpub.com)

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Spurgeon George “Spud” Roscoe, one of the contributors to this document, is the oldest son of Chief Petty Officer George Spurgeon Roscoe C1BK, the General Iron Sheet Metal Instructor at the Mechanical Training Establishment HMCS STADACONA. All engine room ratings of P2 and higher had to take George’s course.

6.0 ABOUT THE AUTHOR

Jerry Proc, VE3FAB, a resident of Etobicoke Ontario, has been a licensed amateur radio operator since 1964 and also holds an Advanced Amateur Radio Operator's Certificate. His interest in electronics was sparked at a very young age and during the 1960's Jerry developed a fascination with military radio gear. In 1970, he graduated with a diploma in Electronics Engineering Technology from the Radio College of Canada. Later, he obtained an Advanced Networking Certificate through Continuing Education Studies program at Humber College, Etobicoke Ontario. Jerry has served in both a technical and managerial capacity in the mainframe computer and data communications field since 1970 and is currently retired from Bell Canada where he was employed as a network support specialist.



Jerry Proc in November 2011

His involvement with the restoration of radio systems aboard HMCS HAIDA started out quite innocently in July of 1992. It has now developed into a very engrossing and stimulating endeavour. In October 1999, his efforts to restore HAIDA's radio rooms and other significant contributions were recognized by the Historic Naval Ships Association and awarded Jerry the Bos'n Marvin Curry award, the first Canadian to receive it. In early 2001, Jerry's research work on radio and radar was officially recognized and incorporated into the Appendices of the book "HMCS HAIDA - Battle Ensign Flying" by Barry Gough.

To see Jerry's other web pages go to : <http://jproc.ca>