INTERNATIONAL MARITIME ORGANIZATION

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A 20/Res.857
3 December 1997
Original: ENGLISH

ASSEMBLY
20th session
Agenda item 9

RESOLUTION A.857(20)
adopted on 27 November 1997

GUIDELINES FOR VESSEL TRAFFIC SERVICES

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO resolution A.158(ES.IV) entitled "Recommendation on Port Advisory Services", resolution A.851(20) entitled "General Principles for Ship Reporting Systems and Ship Reporting Requirements, including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants" and resolution MSC.43(64) entitled "Guidelines and Criteria for Ship Reporting Systems",

BEARING IN MIND the responsibility of Governments for the safety of navigation and protection of the marine environment in areas under their jurisdiction,

BEING AWARE that vessel traffic services have been provided in various areas and have made a valuable contribution to safety of navigation, improved efficiency of traffic flow and the protection of the marine environment,

BEING ALSO AWARE that a number of Governments and international organizations have requested guidance on vessel traffic services,

RECOGNIZING that the level of safety and efficiency in the movement of maritime traffic within an area covered by a vessel traffic service is dependent upon close co-operation between those operating the vessel traffic service and participating vessels,

RECOGNIZING ALSO that the use of differing vessel traffic service procedures may cause confusion to masters of vessels moving from one vessel traffic service area to another,

RECOGNIZING FURTHER that the safety and efficiency of maritime traffic and the protection of the marine environment would be improved if vessel traffic services were established and operated in

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-seventh session,

1. ADOPTS the Guidelines for Vessel Traffic Services and the Guidelines on Recruitment, Qualifications and Training of VTS Operators set out in Annexes 1 and 2 to the present resolution;

2. INVITES Governments to take account of the annexed Guidelines when developing, implementing and operating vessel traffic services;

3. RECOMMENDS Governments to encourage masters of ships navigating in areas for which vessel traffic services are provided to make use of such services;

4. REVOKES resolution A.578(14).

ANNEX 1

GUIDELINES AND CRITERIA FOR VTS

PREAMBLE

1 These Guidelines are associated with SOLAS Regulation V/8-2 and describe the principles and general operational provisions for the operation of a vessel traffic service (VTS) and participating vessels.

2 Contracting Governments should take account of these Guidelines when planning, implementing and operating vessel traffic services.

3 These Guidelines should be used in conjunction with the applicable Guidelines and Criteria for Ship Reporting Systems, resolution MSC.43(64) and the IALA VTS Manual.

1 DEFINITIONS AND CLARIFICATIONS

1.1 The following terms are used in connection with vessel traffic services:

.1 *Vessel traffic service* (VTS) - a service implemented by a Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area.

.2 *Competent authority* - the authority made responsible, in whole or in part, by the Government for safety, including environmental safety, and efficiency of vessel traffic and the protection of the environment.

.3 *VTS authority* - the authority with responsibility for the management, operation and co-ordination of the VTS, interaction with participating vessels and the safe and effective provision of the service.

.4 *VTS area* - the delineated, formally declared service area of the VTS. A VTS area may be subdivided in sub-areas or sectors.

.5 *VTS centre* - the centre from which the VTS is operated. Each sub-area of the VTS may have its own sub-centre.

.6 *VTS operator* - an appropriately qualified person performing one or more tasks contributing to the services of the VTS.

.7 *VTS sailing plan* - a plan which is mutually agreed between a VTS Authority and the master of a vessel concerning the movement of the vessel in a VTS area.

.8 *VTS traffic image* - the surface picture of vessels and their movements in a VTS area.

.9 *VTS services* - VTS should comprise at least an information service and may also include others, such as a navigational assistance service or a traffic organization service, or both, defined as follows:

.9.2 A navigational assistance service is a service to assist on-board navigational decision-making and to monitor its effects.

.9.3 A traffic organization service is a service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the VTS area.

.10 *Allied services* - services are services actively involved in the safe and efficient passage of the vessel through the VTS area.

.11 *Hazardous cargoes* - include:

.11.1 goods classified in the International Maritime Dangerous Goods (IMDG) Code;

.11.2 substances classified in Chapter 17 of the IMO International Code for Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC) Code, and in Chapter 19 of the IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC) Code;

.11.3 oils as defined in MARPOL Annex I;

.11.4 noxious liquid substances as defined in MARPOL Annex II;

.11.5 harmful substances as defined in MARPOL Annex III; and

.11.6 radioactive materials specified in the Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High Level Radioactive Wastes in Flasks on Board Ships (INF) Code.

2 GENERAL CONSIDERATIONS FOR VESSEL TRAFFIC SERVICES

2.1 Objectives

2.1.1 The purpose of vessel traffic services is to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment and/or the adjacent shore area, worksites and offshore installations from possible adverse effects of maritime traffic.

2.1.2 A clear distinction may need to be made between a Port or Harbour VTS and a Coastal VTS. A Port VTS is mainly concerned with vessel traffic to and from a port or harbour or harbours, while a Coastal VTS is mainly concerned with vessel traffic passing through the area. A VTS could also be a combination of both types. The type and level of service or services rendered could differ between both types of VTS; in a Port or Harbour VTS a navigational assistance service and/or a traffic organization service is usually provided for, while in a Coastal VTS usually only an information service is rendered.

2.1.3 The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance. It can also assist in prevention of pollution and co-ordination of pollution response.

The efficiency of a VTS will depend on the reliability and continuity of communications and on the ability to provide good and unambiguous information. The quality of accident prevention measures will depend on the system's capability of detecting a developing dangerous situation and on the ability to give timely warning of such dangers.

2.2 Responsibilities and liability

2.2.1 Where two or more Governments have a common interest in establishing a VTS in a particular area, they should develop a co-ordinated vessel traffic service on the basis of an agreement between them. Where a co-ordinated vessel traffic service is established, it should have uniform procedures and operations.

2.2.2 In planning and establishing a VTS, the Contracting Government or Governments or the competent authority should:

.1 ensure that a legal basis for the operation of a VTS is provided for and that the VTS is operated in accordance with national and international law;

.2 ensure that objectives for the VTS are set;

.3 ensure that a VTS authority is appointed and legally empowered;

.4 ensure that the service area is delineated and declared a VTS area; where appropriate, this area may be subdivided in sub-areas or sectors;

.5 determine the type and level of services to be provided, having regard to the objectives of the VTS;

.6 establish appropriate standards for shore- and offshore-based equipment;

.7 ensure that the VTS authority is provided with the equipment and facilities necessary to effectively accomplish the objectives of the VTS;

.8 ensure that the VTS authority is provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required, taking into consideration, the type and level of services to be provided and the current IMO Guidelines on the recruitment, qualifications and training of VTS operators given in Annex 2;

.9 establish appropriate qualifications and training requirements for VTS operators, taking into consideration the type and level of services to be provided;

.10 ensure that provisions for the training of VTS operators are available;

.11 instruct the VTS authority to operate the VTS in accordance with relevant IMO resolutions;

.12 establish a policy with respect to violations of VTS regulatory requirements, and ensure that this policy is consistent with national law. This policy should consider the consequences of technical failures, and due consideration should be given to extraordinary circumstances that result.

2.2.3 In operating a VTS the VTS authority should:

.1 ensure that the objectives of the VTS are met;

.2 ensure that the standards set by the competent authority for levels of services and operators qualifications and equipment are met;

.4 ensure that the VTS operations are harmonized with, where appropriate, ship reporting and routeing measures, aids to navigation, pilotage and port operations;

.5 consider, where appropriate, the participation of the pilot both as a user and provider of information;

.6 ensure that a continuous listening watch on the designated radio frequencies is kept and that all published services are available during the operational hours of the VTS;

.7 ensure that operating procedures for routine and emergency situations are established;

.8 in a timely manner, provide mariners with full details of the requirements to be met and the procedures to be followed in the VTS area. This information should include the categories of vessels required or expected to participate; radio frequencies to be used for reporting; areas of applicability; the times and geographical positions for submitting reports; the format and content of the required reports; the VTS authority responsible for the operation of the service; any information, advice or instructions to be provided to participating ships; and the types and level of services available. This information should be published in the appropriate nautical publications and in the "World VTS Guide".*

2.2.4 The liability element of an accident following compliance with VTS guidance is an important consideration which can only be decided on a case-by-case basis in accordance with national law. Consequently, a VTS authority should take into account the legal implications in the event of a shipping accident where VTS operators may have failed to carry out their duty competently.

2.2.5 Contracting Governments should ensure that ships flying their flag comply with the requirements of vessel traffic services. Those Contracting Governments which have received information of an alleged violation of a VTS by a ship flying their flag should provide the Government which has reported the offence with details of any appropriate action taken.

2.3 VTS services

The following guidance concerning the services that are rendered by a VTS should be taken into account:

2.3.1 The *information service* is provided by broadcasting information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel, and may include for example reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit.

2.3.2 The *navigational assistance service* is especially important in difficult navigational or meteorological circumstances or in case of defects or deficiencies. This service is normally rendered at the request of a vessel or by the VTS when deemed necessary.

2.3.3 The *traffic organization service* concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations, and is particularly relevant in times of high traffic density or when the movement of special transports may effect the flow of other traffic. The service may also include establishing and operating a system of traffic clearances or VTS sailing plans or both in relation to priority of movements, allocation of space, mandatory reporting of movements in the VTS area, routes to be followed, speed limits to be observed or other appropriate measures which are considered necessary by the VTS authority.

2.3.4 When the VTS is authorized to issue instructions to vessels, these instructions should be result-oriented only, leaving the details of execution, such as course to be steered or engine manoeuvres to be executed, to the master or pilot on board the vessel. Care should be taken that VTS operations do not encroach upon the master's responsibility for safe navigation, or disturb the traditional relationship between master and pilot.

2.3.5 A VTS area can be divided into sectors, but these should be as few as possible. Area and sector boundaries should not be located where vessels normally alter course or manoeuvre or where they are approaching areas of convergence, route junctions or where there is crossing traffic. VTS centres in an area or sector should use a name identifier. The boundaries should be indicated in the appropriate nautical publications and in the "World VTS Guide".[1]

2.4 Communication and reporting

2.4.1 Communication between a VTS authority and a participating vessel should be conducted in accordance with the Guidelines and Criteria for Ship Reporting systems and should be limited to information essential to achieve the objectives of the VTS.[2] IMO Standard Marine Communication Phrases should be used where practicable.

2.4.2 In any VTS message directed to a vessel or vessels it should be made clear whether the message contains information, advice, warning, or an instruction.

2.5 Organization

2.5.1 *Elements of a VTS*

In order to perform the required tasks a VTS organization requires adequate staff, housing, instrumentation and procedures governing operations and interactions between the various elements. The requirements in each field are determined by the particular nature of the VTS area, the density and character of the traffic and the type of service that is to be provided. Consideration should be given to the establishment of back-up facilities to sustain and maintain the desired level of reliability and availability.

2.5.2 *Tasks that may be performed in accordance with the service rendered*

2.5.2.1 A VTS should at all times be capable of generating a comprehensive overview of the traffic in its service area combined with all traffic influencing factors. The VTS should be able to compile a traffic image, which is the basis for its capability to respond to traffic situations developing in its service area. The traffic image allows the VTS operator to evaluate situations and make decisions accordingly. Data should be collected to compile the traffic image. This includes:

.1 data on the fairway situation, such as meteorological and hydrological conditions and the operational status of aids to navigation;

.2 data on the traffic situation, such as vessel positions, movements, identities and intentions with respect to manoeuvres, destination and routing;

.3 data of vessels in accordance with the requirements of ship reporting and if necessary any additional data, required for the effective operation of the VTS.*

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[1]Refer to MSC Circular 586 on the IALA/IAPH/IMPA World VTS Guide.

[2]Refer to the Guidelines and Criteria for Ship Reporting Systems, paragraph 2.2, Communication. Resolution MSC.43(64)

2.5.2.2 Vessel's reports by communication between vessels and the VTS Centre should also be used as a major source of necessary data.

2.5.2.3 To respond to traffic situations developing in the VTS area and to decide upon appropriate actions the acquired data should be processed and evaluated. Conclusions from the evaluation need to be communicated to participating vessels. A distinction should be made between the provision of navigational information, being a relay of information extracted from the VTS sensors and the traffic image, and the provision of navigational advice, where a professional opinion is included.

2.5.3 *Operating procedures*

Where operating procedures are concerned, a distinction should be made between internal and external procedures. Internal procedures cover operating instruments, interactions among the staff and the internal routing and distribution of data. External procedures cover interactions with users and allied services. A further distinction should be made between procedures governing the daily routine and procedures governing contingency planning such as search and rescue and environmental protection activities. All operational procedures, routine or contingency, should be laid down in handbooks or manuals and be an integral part of regular training exercises. Adherence to procedures should be monitored.

2.5.4 *Database*

A VTS authority should have, if necessary for the operation of the service, a database with the capacity to retain, update, supplement and retrieve data once collected. Any data retained in a system for further use should be made available only on a selective and secure basis.

2.6 Participating vessels

2.6.1 Vessels navigating in an area where vessel traffic services are provided should make use of these services. Depending upon governing rules and regulations, participation in a VTS may be either voluntary mandatory. Vessels should be allowed to use a VTS where mandatory participation is not required.

2.6.2 Decisions concerning the actual navigation and the manoeuvring of the vessel remain with the master. Neither a VTS sailing plan, nor requested or agreed changes to the sailing plan can supersede the decisions of the master concerning the actual navigation and manoeuvring of the vessel.

2.6.3 Communication with the VTS and other vessels should be conducted on the assigned frequencies in accordance with established ITU and SOLAS chapter IV procedures, in particular where a communication concerns intended manoeuvres. VTS procedures should stipulate what communications are required and which frequencies should be monitored. Prior to entering the VTS area, vessels should make all required reports, including reporting of deficiencies. During their passage through the VTS area, vessels should adhere to governing rules and regulations, maintain a continuous listening watch on the assigned frequency and report deviations from the agreed sailing plan, if such a plan has been established in co-operation with the VTS authority.

2.6.4 Masters of vessels should report any observed dangers to navigation or pollution to the VTS centre.

2.6.5 In case of a complete failure of the vessel's appropriate communication equipment the master shall endeavour to inform the VTS centre and other vessels in the vicinity by any other available means of communication of the vessel's inability to communicate on the assigned frequency. If the technical failure prevents the vessel from participation or continuing its participation in a VTS, the master should enter in

2.6.6 Vessels should carry publications giving full particulars on governing rules and regulations regarding identification, reporting and/or conduct in the VTS area to be entered.

3 GUIDANCE FOR PLANNING AND IMPLEMENTING VESSEL TRAFFIC SERVICES

3.1 Responsibility for planning and implementing a VTS

It is the responsibility of the Contracting Government or Governments or Competent Authorities to plan and implement vessel traffic services or amendments to such services.

3.2 Guidance for planning a vessel traffic service

3.2.1 Local needs for traffic management should be carefully investigated and determined by analysing casualties, assessing risks and consulting local user groups. Where the risks are considered VTS addressable, in cases where monitoring of the traffic and interaction between Authority and participating vessel is considered to be essential, the implementation of a VTS, as an important traffic management instrument, should be considered.

3.2.2 A VTS is particularly appropriate in an area that may include any of the following:

.1 high traffic density;

.2 traffic carrying hazardous cargoes;

.3 conflicting and complex navigation patterns;

.4 difficult hydrographical, hydrological and meteorological elements;

.5 shifting shoals and other local hazards;

.6 environmental considerations;

.7 interference by vessel traffic with other marine-based activities;

.8 a record of maritime casualties;

.9 existing or planned vessel traffic services in adjacent waters and the need for co-operation between neighbouring States, if appropriate;

.10 narrow channels, port configuration, bridges and similar areas where the progress of vessels may be restricted;

.11 existing or foreseeable changes in the traffic pattern resulting from port or offshore terminal developments or offshore exploration and exploitation in the area.

3.2.3 In further deciding upon the establishment of a VTS, Contracting Governments or competent authorities should also consider the responsibilities set forth in 2.2 of these Guidelines and Criteria, and the availability of the requisite technology and expertise.

3.3 Further guidance on vessel traffic services

3.3.1 VTS Authorities should, in the planning of the VTS to be established, make use of available

.1 IMO Guidelines and Criteria for Ship Reporting Systems (resolution MSC.43(64))

.2 General Principles for Ship Reporting Systems and Ships Reporting Requirements, including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants (resolution A.851(20))

.3 The IALA vessel traffic services Manual

.4 IALA/IMPA/IAPH/World VTS Guide

ANNEX 2

GUIDELINES ON RECRUITMENT, QUALIFICATIONS AND TRAINING OF VTS OPERATORS

PREAMBLE

1 These Guidelines elaborate specifically on 2.2.2.8 of Annex 1, which requires the VTS authority to be provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required, taking into consideration the type and level of services to be provided in conformity with the current IMO Guidelines on the subject.

2 These Guidelines describe the skill and knowledge qualifications required by VTS operators to provide these services. They are intended for application in both planned and existing VTS. They provide guidance in determining how VTS authorities can recruit, select and train personnel in order to carry out their tasks to provide the required VTS standards.

3 These Guidelines do not confer any powers on VTS operators, nor shall they be construed as prejudicing obligations or rights of vessels established in other international instruments.

1 INTRODUCTION

1.1 Background

1.1.1 In recent years, there has been a rapid expansion in vessel traffic services, which has led to a significant increase in the number of VTS operators required world-wide. The services offered by VTSs vary considerably, and range from simple broadcasts of meteorological and hydrological information, through exchange of information to sophisticated navigational advice and, in circumstances where the authority exists, navigation-related instruction.

1.1.2 Investigation of existing services reveals a wide variety of VTS operator entry requirements, ranging from personnel with no nautical background to those with a Master's and/or Pilot's licence. There is an equally wide variation in the type and extent of training provided to VTS operators.

1.1.3 The various levels of knowledge and skill required of the operator, and the standard of training necessary to achieve these levels, have never been fully defined on a world-wide basis. At present there are no internationally recognized qualifications for VTS operators, and the approach to recruitment and training varies widely from country to country.

1.1.4 Given the role of VTS in the provision of safety and efficiency services to shipping and in the protection of the environment, the need to avoid confusion on the part of users travelling from one VTS to another and the importance of professionalism on the part of operators in determining the extent of trust placed in the functioning and effectiveness of a VTS, it is essential that VTS personnel be adequately qualified and trained to carry out their functions, and that the standards for such qualification and training be agreed upon internationally to a large extent.

1.2 Definitions

For the purpose of this Annex, the following terms shall have the meanings defined below; however, all other terms used which have already been defined in Annex 1 (Guidelines and Criteria for

.1 *Advanced training* - training usually carried out at the supervisory level, designed to enhance and utilize the employees' knowledge and experience to the fullest;

.2 *Basic training* - the training required in order to carry out the functions assigned to a position. This type of training requires a high level of supervision;

.3 *Classroom training* - training carried out in a classroom environment that enables trainees to acquire the knowledge and skills necessary to reach the level of proficiency required to fully perform the duties of a position;

.4 *Knowledge* - information about certain facts, theories, systems, procedures and other subject matter relevant to the duties and responsibilities of the position;

.5 *On-the-job training* - training within the work environment which is considered formal and reportable when it involves non-productive person hours; it is instructor or computer managed, has specific learning objectives, and has milestones to measure progress. It is structured, has specific resources devoted to or consumed by it, and the trainee within the work environment is relieved of his/her regular or normal duties;

.6 *Operator competence* means having the qualifications essential to effectively and efficiently carry out the functions or sub-functions assigned to a particular VTS operator position;

.7 *Personal suitability* means personal traits and characteristics affecting the application of knowledge and skills in the performance of the duties of the position;

.8 *Qualifications* - education, knowledge, skill, experience or any other attribute which are necessary or desirable for performing the duties of the position;

.9 *Recruitment and selection* - staffing process in which prospective job candidates are identified or considered for a position in terms of their relative suitability for a position based on certain criteria, e.g., knowledge and experience or any other matters that are necessary or desirable having regard to the nature of the duties to be performed. Candidates are selected by conducting examinations, tests, interviews and investigations;

.10 *Refresher training* - training carried out to maintain a certain level of performance, skill in areas or knowledge which are infrequently used and where consequence of non-performance is great;

.11 *Simulator training* - training carried out in an appropriate environment in order to practice skills and perform the duties of the position;

.12 *Skill* - relevant aptitudes or prescribed level of occupational achievements which are basic to the performance of the duties and responsibilities of the position;

.13 *Standards* - criteria, features, methods or processes which are recognized as or agreed to be models for imitation against which like activities will be compared or measured;

.14 *Sub-functions* - specific processes and procedures which are component activities of a particular function;

.15 *Training* - a process of combining instruction and practice to provide employees with the skill, knowledge and experience necessary to perform in their present/future jobs both

.17 *VTS category* - refers to a means of identifying the type and level of services provided by a VTS based on geographical or organizational considerations. For example, a VTS operating in a port and its approaches could be categorized as a port VTS. A VTS in which participation is required by law could be categorized as a mandatory VTS, as opposed to a voluntary VTS;

.18 *VTS functions* - can be subdivided into internal and external functions. Internal functions are the preparatory activities that have to be performed to enable a VTS to operate. These include data collection, data evaluation and decision making. External functions are activities executed with the purpose of influencing the traffic characteristics. They relate to the primary traffic management functions of rule-making, allocation of space, routine control of vessels and manoeuvres to avoid collisions, as well as to other management functions such as enforcement, remedial and ancillary activities. The reasoning behind these traffic management functions and their relationship to the VTS services is set out in paragraph 6.4;

.19 *VTS operator* - a VTS operator is an appropriately qualified person performing one or more tasks contributing to the services of the VTS. However, for the specific purposes of these Guidelines, VTS operator further means a person who provides, if duly authorized, instructions and information to vessels and decides what action should be taken in response to data received. This person may be directly responsible for communications within a defined geographical area within a VTS area, or may relay such information and decisions through an intermediary; and

.20 *VTS operator position* - a position in a specific VTS from which a VTS operator carries out the VTS functions as defined for purposes of these Guidelines.

2 OBJECTIVES AND AUTHORITY

2.1 Objectives

2.1.1 The objectives of these Guidelines are:

.1 to provide authorities with a logical process to follow in selecting and recruiting VTS operators, and in establishing qualification and training standards which will ensure that the necessary knowledge and skill profiles exist to enable them to carry out their functions to appropriate standards; and

.2 to establish knowledge and skill requirements and standards which VTS operators should meet with respect to certain functions.

2.2 Competent authority

2.2.1 Subject to their own national and local requirements and constraints, authorities will need to establish training requirements for their VTS operators. Authorities will also need to set specific knowledge, skill and personal suitability standards which operators must meet. Nothing in these Guidelines derogates from that power or imposes any obligation on authorities.

2.2.2 These Guidelines should not be construed as conferring any additional power on authorities with respect to the operation of a VTS outside territorial seas.

3 FRAMEWORK

3.1 Explanation of framework

3.1.1 These Guidelines provide a framework within which authorities can meet their obligations as laid down in Annex 1 to provide VTS operators with the competence to carry out their designated functions, independent of the level of qualifications of personnel recruited. This framework is shown in figure 1.

3.1.2 The framework outlines the steps that should be taken by a VTS authority to ensure that its VTS operators are competent to carry out assigned tasks. These steps are in two stages:

.1 Stage 1:

Preliminary steps to be able to take decisions relative to operator competencies (prerequisites for the system).

.2 Stage 2:

Steps to ensure that operators possess or achieve, and then maintain, the level of competence required to carry out their assigned functions (system parameters).

3.1.3 In order to implement the steps outlined above, VTS authorities must be prepared to bring to bear certain competencies which are normally available to them. Specifically, input is required from VTS operations and from training and human resources expertise in order to successfully design and implement a programme to match VTS operator competencies with operational need. The particular areas where such expertise is required are indicated in figure 1.

4 PREREQUISITES FOR THE SYSTEM

4.1 In order to be able to identify, develop and implement a system for VTS operator qualification and training, authorities should first take a number of preliminary steps in order to ensure that the operator's competencies are appropriately aligned with the functions for which he/she is responsible. These steps are as follows:

.1 *Implementing a VTS* - make a decision, or have made a decision to implement a VTS.

.2 *Identification of VTS functions* - identify and describe the detailed functions relevant to the given VTS. These detailed functions have been developed from the general VTS functions described in 2.3 and 2.5 of Annex 1.

.3 *Organization of VTS centre functions* - organize the functions according to how they are to be carried out in accordance with the organization of the internal VTS operation.

.4 *Establishment of VTS operator positions* - be prepared to establish, or have already established, operator positions within a VTS, determine what functions will be carried out from which positions, and be prepared to ensure that there will be personnel occupying those positions who have been given responsibility for carrying out the identified functions.

4.2 Plans for recruitment and selection of VTS operators can be developed once these steps have been completed.

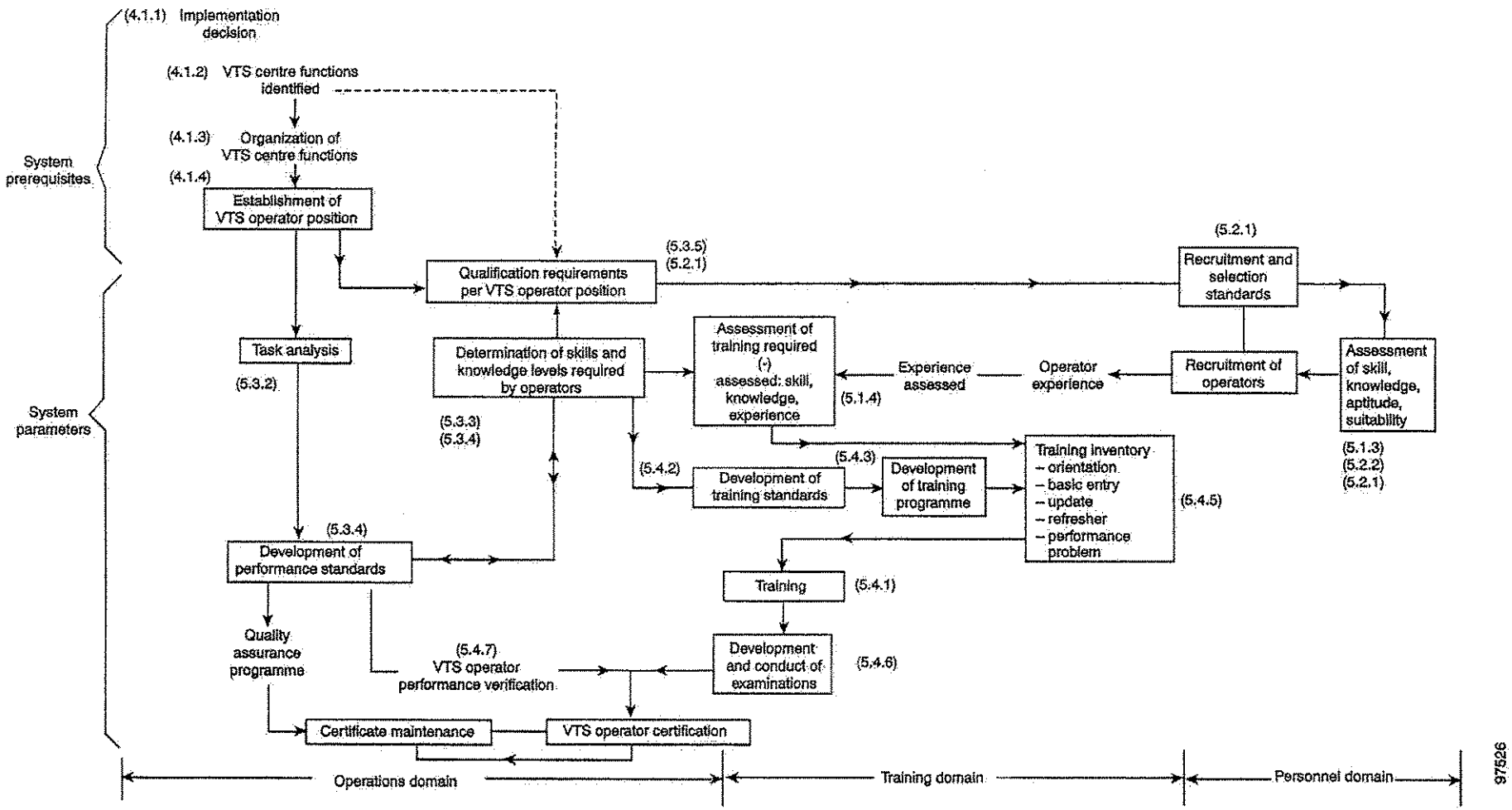

Figure 1 – *A system for development of recruitment, qualifications and training of Vessel Traffic Service operators*

5 SYSTEM PARAMETERS

5.1 General

5.1.1 The views of authorities on recruitment qualifications may vary between a preference for a low qualification entry requiring a high degree of training, to a preference for a high qualification entry requiring a low degree of training. Clearly, if a high entry qualification is combined with relevant local experience, training requirements will be minimized.

5.1.2 Ideally, authorities should have the ability to specify the background and prior experience a VTS operator should have, but due to circumstances, this is often beyond their control. They should, however, be able to specify the level of skill and knowledge that a recruit must have achieved based on this prior experience (e.g., master mariner, top level air traffic controller).

5.1.3 VTS authorities should therefore establish methods of assessing the skill and knowledge of recruits and existing VTS operators relative to the requirements of the tasks or functions they perform.

5.1.4 Depending on the skill and knowledge levels previously acquired, and the tasks or functions to be performed, authorities may need to supplement existing qualifications with appropriate training to make up any deficiencies.

5.2 Recruitment and selection

5.2.1 Authorities should establish entry standards for new VTS operators coming into the system in terms of prior skills, knowledge, and personal suitability characteristics relevant to the tasks or functions they will be required to perform. These skills and knowledge may in part be assessable through existing qualifications (e.g., master or pilot's licence).

5.2.2 VTS authorities may wish to consider introducing additional screening mechanisms to ensure that recruits have the necessary aptitudes, personal suitability characteristics, and ancillary skills for the functions they will be assigned. These mechanisms will assess, *inter alia*, ability to meet medical standards commensurate with the working conditions of the VTS position in question, spatial problem-solving capabilities and other job-related aptitudes, ability to work under pressure; and language capability required for the particular VTS.

5.3 Qualifications

5.3.1 Authorities must be able to determine what competencies a VTS operator must possess to carry out assigned functions, in order to establish the combination of prior qualifications and subsequent training required to ensure that their operators are competent.

5.3.2 To this end, they should analyse in detail the tasks which the operator will have to carry out in order to accomplish the specified functions, in terms of the skills and knowledge which he/she must possess to implement them successfully.

5.3.3 Having carried out the task analysis, authorities must specify the types of skill and knowledge which operators must possess in order to perform their functions. These skill and knowledge components should relate directly to the functions to be performed, and should be specified in such a way that authorities will be able to determine whether:

.1 VTS operators possess them in terms of their prior qualifications and experience; or

5.3.4 Once the necessary types of skill and knowledge have been established, authorities should determine to what level they must be possessed by a VTS operator. Authorities therefore have a responsibility to establish performance standards for skill and knowledge types to be acquired.

5.3.5 Because not all VTSs carry out the same range of functions, and because some operators may only carry out limited functions within a particular service, authorities may be required to identify different knowledge and skill levels for operators based on the tasks they perform in the VTS in which they work.

5.4 Training

5.4.1 Where the types and/or levels of skill and knowledge possessed by a VTS operator, by virtue of his or her prior experience and qualifications, do not fully conform to those required in order to carry out assigned tasks, authorities should provide compensatory training in areas of deficiency.

5.4.2 Authorities should establish concomitant training standards for those areas where they train VTS operators to the proficiency requirements of their positions. These training standards should form the basis of any training programme to be developed and delivered to VTS operators.

5.4.3 Based on the training standards, authorities should then be prepared to develop and implement a training programme which, when taken together with relevant existing experience, will provide the VTS operator with necessary skills and knowledge to perform his/her tasks to the required standards.

5.4.4 There are a variety of mechanisms by which training can be carried out. These include training provided by authorities directly, contracted out training or any other training establishment common to interested Administrations, which trains VTS operators for a number of authorities.

5.4.5 Authorities may also wish to consider the need to provide different types of training, with different levels relative to each type, in order to ensure the acquisition and maintenance of the relevant skills and knowledge necessary to meet job requirements, according to the following matrix:

TYPE OF TRAINING LEVEL OF TRAINING	CLASSROOM	SIMULATOR	ON THE JOB
BASIC	X	X	X
ADVANCE	X	X	X
UPGRADING	X	X	X
REFRESHER	X	X	X

Authorities should be aware of the advantages of a modular approach to training for ease and cost-effectiveness of training delivery.

5.4.6 Authorities may wish to institute a system of examinations to determine whether or not operator experience, qualifications and training are resulting in performance to required standards.

5.4.7 Once suitably qualified and trained employees are performing on the job, their performance must be observed and monitored to ensure that it continues to meet the established standards.

5.4.8 Authorities should be aware that for an operator to carry out VTS functions effectively, training may be required in areas not specifically related to VTS (e.g., typing, supervisory skills), and which are not specifically covered in these Guidelines.

Authorities may wish to introduce a formal system of certification as a means of ensuring and demonstrating to system users that a mechanism is in place which matches employee competence with task requirements.

6 DETERMINING SKILL AND KNOWLEDGE REQUIREMENTS ASSOCIATED WITH VTS FUNCTIONS

6.1 The process used to determine the knowledge and skill types and levels required by VTS operators to carry out specific VTS functions is outlined below. It can also be used by authorities to determine how they might wish to establish the difference between skill and knowledge levels required of VTS operators on recruitment (prior qualifications) and those which will be provided after recruitment (training). Additionally, it can be used to determine the type and degree of training which should be provided to operators already employed by VTS and who may possess some form of prior qualification.

NOTE: It must be noted by authorities that this process is a model only. Authorities wishing to make use of this process must keep in mind that it will need to be adapted to meet their specific local requirements.

Also, because it is not a mathematical model, authorities must also keep in mind the importance of the human decision-making function, which cannot be scientifically measured, and therefore cannot be completely addressed in this process.

Consequently, in determining skill and knowledge types and levels for VTS functions, authorities will need to decide on the level of freedom VTS operators will have in making decisions based on judgement.

6.2 The general process for determining skill and knowledge requirements is as follows:

.1 define terms and identify functions to be considered. Functions or sub-functions may be classed as H(igh) or L(ow) to indicate the involvement of VTS;

.2 divide functions identified into sub-functions. This process of subdivision will be continued as long as necessary to identify the skill and/or knowledge requirements necessary on the part of the VTS operator in order to perform the function. The results of this breakdown will be a list of skill and knowledge components, all of which are detailed actions to be performed, the sum of which constitutes carrying out the function (this process is illustrated in figure 2 and an example of it shown in figure 3);

.3 at the final level of sub-division, make each component action sufficiently detailed to enable it to be classified as either skill or knowledge to be performed; and

.4 review and verify that sub-division is complete.

6.3 Once the individual component actions have been classified in this manner, the level of skill or knowledge required for their performance will then be evaluated. The following criteria will be used, on a weighted basis:

.1 frequency - how often the task is performed;

.2 percentage of time used in performance of the task relative to other tasks;

.3 value - importance of the particular skill or knowledge in the performance of the task, whether "must know" (mandatory), "should know" (important), or "nice to know" (optional);

.4 liability - consequence of error or omission during the performance of a function;

.5 performance standard - how well must the individual perform in the conduct of the task and the learning difficulty associated with it;

.6 verification and intervention - whether the individual can perform the task with or without supervision;

.7 performance tools - equipment and established procedures involved in the implementation of the function; and

.8 reasons why the performance of the task is important.

Skills involved include, but are not necessarily restricted to: ability to operate communications and surveillance equipment; ability to do chart work; ability to provide navigational assistance; and ability to operate ancillary equipment such as telephones, telex, tide and meteorological equipment. Examples of knowledge which may be required include: local geography; principles of navigation; applicable acts, regulations, agreements and publications; communications procedures and vocabulary[1]; principles of organization of vessel traffic.

6.4 In the definition in 1.2.18 a number of traffic management functions have been identified. VTS can play an important role in the execution of these functions, which may be taken as the basis for the process described in 6.1 to determine the skill and knowledge types and levels for VTS operators contributing to the execution of traffic management functions. The objectives of traffic management functions and their relationship to the VTS services are briefly described below:

.1 *Internal VTS functions*:

- data collection; and
- data evaluation/decision making.

.2 *Traffic management functions*:

.2.1 *Primary function*:

- allocation of space. This is effecting separation in space and/or time between vessels, or certain categories of vessel, by forward planning. It is a strategical function that can be performed by a traffic organization service;
- routine control of vessels. This is a shipboard process to which a VTS contributes by supplying data relevant to the navigational decision-making process on board. This function relates to an information service and/or a navigational assistance service;

[1]Refer to the Standard Marine Navigational Vocabulary as replaced by the IMO Standard Marine Communication Phrases (currently under trials).

- manoeuvres to avoid collisions. This is a shipboard function concerning ships in encounter situations. It may be assisted by a VTS. It is a tactical function and relates to an information service and/or a navigational assistance service.

.2.2 *Enforcement function*

The objective of this function is to encourage and monitor adherence to applicable rules and regulations and to take appropriate action where required and within the authority of the VTS. Some aspects of this function might be covered by a traffic organization service.

Remedial functions

These functions are aimed, primarily, at reducing the effects and consequences of incidents, such as search and rescue, salvage and pollution. These functions may be performed by a VTS in support of allied activities.

Other functions

These functions relate to co-ordination and liaison between vessels and third parties. They may be performed by a VTS as support of allied activities.

Figure 2:

ANALYSIS OF FUNCTION INTO SKILL AND KNOWLEGE COMPONENTS

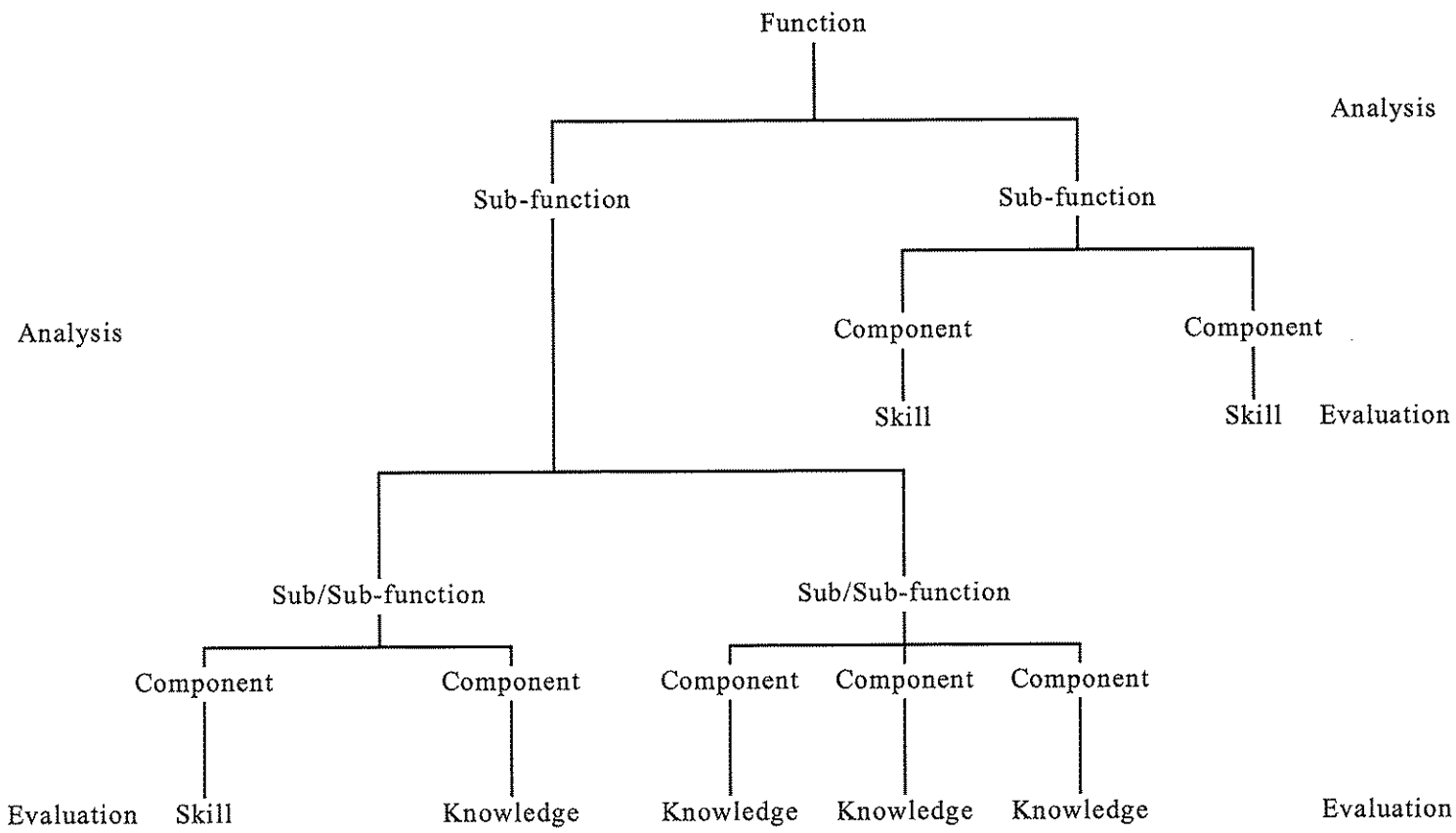
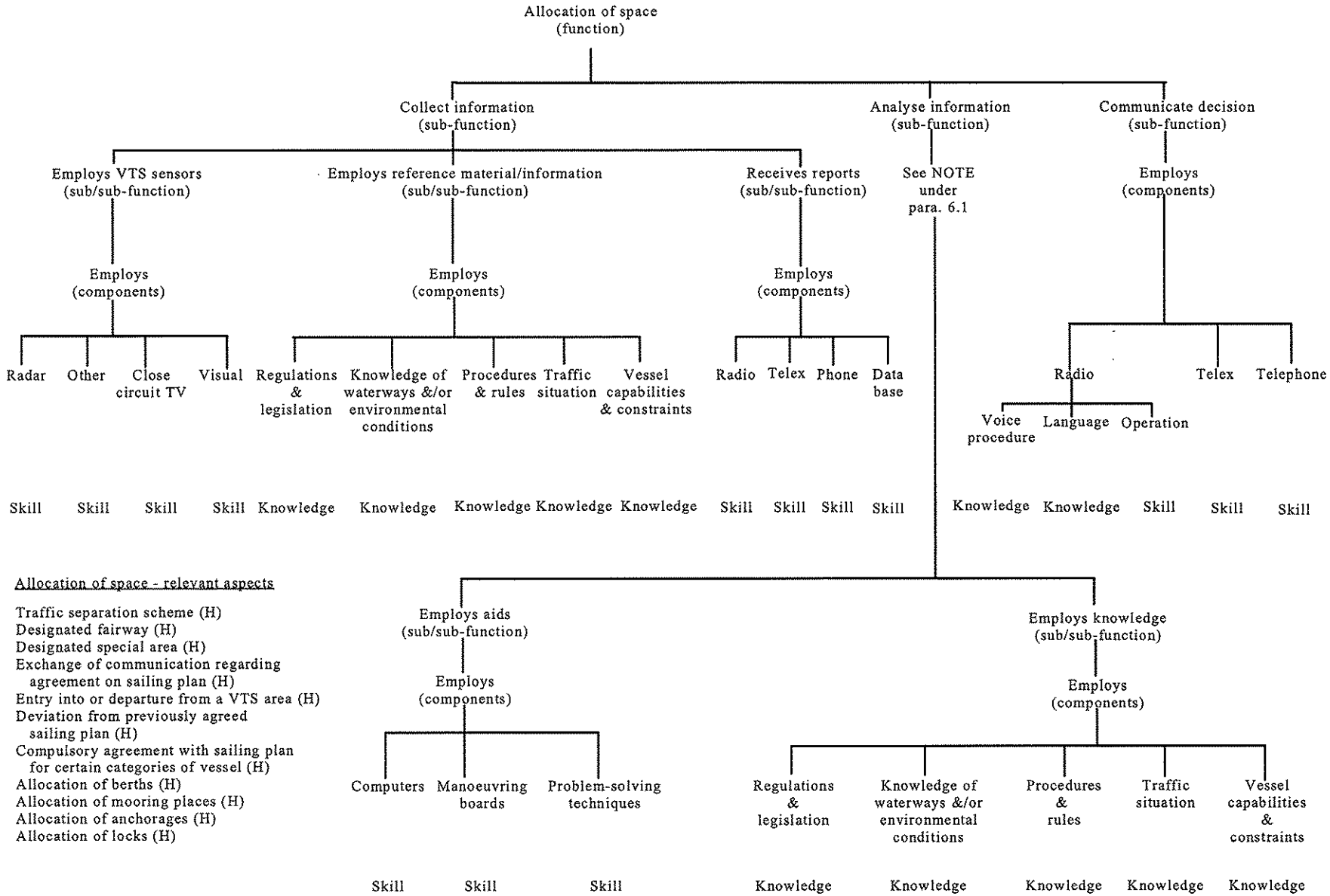
Figure 3 ANALYSIS OF TRAFFIC MANAGEMENT FUNCTIONS INTO SKILLS AND KNOWLEDGE COMPONENTS FOR VTS OPERATORS