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Lost at Sea or Found by AI? Translating Maritime Terminology in the Digital Age

Ioana-Raluca VIŞAN*

Abstract: Artificial intelligence (AI) has transformed professional translation, yet maritime terminology remains difficult to translate because of its complexity and standardisation. This paper examines how four machine translation (MT) systems, ChatGPT, Gemini, DeepL and Google Translate, render English maritime terminology into Romanian. The corpus comprises excerpts from COLREG and the IMO Standard Marine Communication Phrases, evaluated against their official Romanian translations. In the texts examined, large language model (LLM)-based systems reproduced codified terminology more reliably than dedicated MT engines, and their Rule 18 output improved between two rounds. All four systems, however, failed to translate fixed collocations and non-compositional expressions consistently, at times reversing their meaning. Where MT output follows the English wording more literally than the official translation, it misses the conventional Romanian equivalents. Since accuracy in this domain is a matter of operational safety, the paper calls for specialised terminology databases, improved contextual algorithms and structured user feedback.

Keywords: maritime terminology, machine translation (MT), large language models (LLMs), English - Romanian translation, COLREG, IMO SMCP

1. Introduction

Artificial intelligence (AI) and machine translation (MT) have changed the way many professions work, and translation and interpreting are no exception (Al Aquad 2025). In the maritime industry, digital transformation has accelerated the adoption of AI in a wide range of operational and administrative activities. These include maritime security, autonomous navigation, predictive maintenance, route optimisation, weather forecasting, documentation management and decision support (Gamage et al. 2023; Rudzińska et al. 2024; Galdelli et al. 2025; Miller et al. 2025; Talpur et al. 2025). As globalisation and digitalisation continue to shape the industry, the need for precise

* Lecturer, PhD, Centre for Research on Specialized Languages from a Multidisciplinary Perspective, Faculty of Letters, "Ovidius" University of Constanţa, Romania, E-mail: ioanaralucavisan@yahoo.com

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translation of specialised terminology keeps growing. English is the dominant language of maritime operations and the main medium of navigation, shipping logistics and international trade. In this respect, the maritime field resembles other technical domains in which English functions as a lingua franca and shapes the terminology of the target languages (Buzarna-Tihenea 2015a). Maritime language is a branch of language for specific purposes (LSP), and it reflects the complexity and interdisciplinary nature of the field (Vișan 2021a). Its terminology extends beyond navigation and ship operations to maritime law, shipbuilding, logistics, finance and engineering. Translating it is therefore challenging, because many terms carry contextual meanings that require domain knowledge for accurate interpretation (Vișan 2023).

At the lexical level, maritime discourse shows a high frequency of multiword terms: collocations, compound nominal phrases, and prepositional and phrasal verbs. Maritime texts also make consistent use of abbreviations, which translators must be able to decode. Collocations and compounds are particularly delicate in translation (Vișan 2021b). They require competence in both the source and the target maritime language, as well as a sound understanding of the subject matter. To translate accurately, maritime translators must identify the relevant lexical and terminological fields and grasp the tone and purpose of the text. This understanding is essential for interpreting terms, collocations, idiomatic expressions and the text as a whole.

Although the global maritime industry generates a large volume of translation, published research on the translation of maritime terminology remains scarce, particularly in relation to MT. As I argued in a previous study (Vișan 2023), the same gap characterises empirical research on maritime genres more generally. MT research has focused mainly on domain adaptation in well-established fields, such as medicine, law and technical communication. This is surprising, given the importance of the maritime domain for international trade, global employment, maritime safety and environmental protection. The gap also appears in Romanian translation research. A survey of 220 doctoral theses defended in Romania between 1993 and 2021 identified only three that investigated MT (Dejica et al. 2022; see also Dejica 2026b). Similar deficits have been reported for localisation, where the ability of AI tools to capture Romanian linguistic and cultural features remains largely unexplored (Mali and Dejica 2025).

The lack of research is compounded by a technical problem. MT systems struggle with specialised terminology and phraseology when they lack dedicated linguistic resources and domain-adapted training data. In the maritime sector, this matters: regulations, technical communication and operational procedures depend on precise and consistent terminology, and they must comply with international standards. The scarcity of research is therefore both a gap in translation studies and a practical obstacle for anyone developing translation tools for this domain.

In this article, I investigate how four contemporary MT systems, ChatGPT, Google Translate, DeepL and Gemini, translate maritime terminology from English into Romanian. The study is based on a manual, qualitative analysis of a corpus of

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specialised maritime texts and carefully selected representative sentences. I evaluate and comment on the translations according to predefined linguistic and domain-specific criteria, described in Section 4.3. I pay particular attention to each system's ability to keep terminology consistent across different communicative contexts. More specifically, the study seeks to answer the following research questions: (a) To what extent do contemporary MT systems accurately render English maritime terminology into Romanian? (b) Which types of maritime terms (e.g., fixed collocations, multiword terms and non-compositional expressions such as standard orders) pose the greatest challenges for MT systems, and do these challenges differ between regulatory and operational texts? (c) How do the four systems compare in terms of terminological precision, semantic fidelity, contextual appropriateness, grammatical acceptability and compliance with maritime conventions?

To contextualise this evaluation, the following section reviews the evolution of machine translation technologies and examines current research on MT in specialised domains. This background provides the framework for assessing the performance of contemporary MT systems in the translation of maritime terminology.

2. The Evolution of MT and its Performance in Specialised Domains

This section situates the present study within the history of MT research and examines how MT has performed in other specialised domains. Insights from adjacent high-stakes fields, such as law, medicine and science, offer a comparative framework for interpreting MT performance in maritime translation. MT has evolved through three main paradigms: Rule-Based MT, dominant from the 1950s to the 1970s but limited by rigid grammar rules (Hutchins and Somers 1992; Koehn 2010); Statistical MT, which replaced rules with corpus-driven methods from the 1980s to the 2000s but struggled with rare words, idioms, and coherence (Koehn 2010; Papineni et al. 2002); and Neural MT, which since the mid-2010s has used deep learning to achieve more fluent, contextually coherent output (Bahdanau et al. 2015; Vaswani et al. 2017; Hassan et al. 2018).

Since the early 2020s, large generative language models such as GPT-3 and GPT-4 have extended this trajectory further, producing fluent, context-aware translations that in some benchmarks outperform dedicated MT systems, albeit with ongoing concerns regarding fidelity and output control (Kocmi and Federmann 2023; Yan et al. 2024). A similar shift has transformed interpreting technology in the era of large language models (Gurwindler 2025).

Within specialised domains specifically, research shows that AI models often perform strongly in recognising and translating domain-specific terminology, at times surpassing less experienced human translators (Mohamed et al. 2024; Yan et al. 2024). However, they remain inconsistent in applying established terminology and glossaries, and also struggle with neologisms, abbreviations, and acronyms underrepresented in their training data, which can lead to inaccurate translations or hallucinations (Briva-Iglesias et al. 2024). This points to the continued need for

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human review, particularly in high-stakes fields such as medicine (Mohamed et al. 2024; Yan et al. 2024; Briva-Iglesias et al. 2024). In medical translation, the consequences of error are direct: a poor translation may endanger patients' lives (Buzarna-Tihenea 2015b). Recent interview evidence from English–Romanian medical translation confirms this. Professional translators use MT mainly as a support tool, because of persistent terminological and contextual errors, and they regard post-editing as indispensable (Kovacs and Dejica 2026). Maritime translation shares this safety-critical dimension. Fu and Liu (2024) and Altakhaineh et al. (2025) find that MT systems reproduce source-text structures more literally than human translators do. Human translators adapt style, register, and cultural framing more flexibly. This complementarity, namely AI's speed and consistency versus human interpretive and cultural competence, supports the growing interest in hybrid translation models (Fu and Liu 2024; Rui 2025). Classroom research points in the same direction. In a think-aloud study, Romanian translation students who compared their own solutions with ChatGPT output criticised its literalism and lack of attention to context, a reminder of the continuing role of human judgement in specialised translation (Dejica and Grigoraș 2025). A classroom experiment on the pre-translation phase of economic news led to similar conclusions. The AI platform proposed useful sources and candidate terms, but in one case it misunderstood the term-extraction task, and its outputs generally required human evaluation and validation (Sărmașiu 2026). In such workflows, the translator's role shifts from traditional linguistic mediation towards post-editing and strategic decision-making (Sărmașiu 2026).

Findings from specialised fields reinforce this pattern. According to Briva-Iglesias et al. (2024), in legal translation, GPT-4 outperformed Google Translate and DeepL in semantic accuracy and terminological precision despite lower BLEU scores. Furthermore, in biomedical contexts, GPT-4-based systems achieved near-human performance on automatic and human evaluation metrics (S. C. Lu et al. 2025; Chen et al. 2025), with strong correlation observed between COMET scores and human judgement (Chen et al. 2025), though persistent weaknesses remained in handling idiomatic language, cultural nuance, and context-dependent expressions (S. C. Lu et al. 2025; Chen et al. 2025). In scientific translation, ChatGPT-3.5 matched human graduate students in output quality and showed highly consistent terminology use, though human translators produced more readable, convention-adherent texts (Fu and Liu 2024). Similarly, GPT-4 performed at a level of junior-to-mid-level translators in technical and biomedical texts. It was less effective than experienced translators in news translation, which is culturally and pragmatically demanding. Even so, its more literal style sometimes reduced interpretive errors (Yan et al. 2024). According to Dejica (2026a, 201), scientific translation is increasingly shaped by technologically mediated workflows, which require translators to evaluate and post-edit AI output while managing specialised terminology and domain conventions. For technical translation, Dejica (2026b, 253) goes further. Technology, he argues, is no longer ancillary but constitutive: CAT environments, termbases, quality-assurance tools and AI-supported pipelines shape the translator's micro-decisions. Quality must therefore

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be assessed not only through terminological fidelity, but also through task success, error reduction and regulatory compliance.

Hybrid workflows have developed in response. Expert post-editors make comparable corrections and need similar editing time for AI-generated and human translations (Fischer and Läubli 2020; Yang et al. 2023). MT-assisted post-editing can also increase productivity by roughly 200% without loss of quality (Turner et al. 2014). The European Union, for instance, uses MT in its multilingual workflows but keeps human review as a quality safeguard, since ambiguity and safety-critical precision still require human judgement. These findings are highly relevant to the maritime sector, where translation accuracy has direct operational, legal and safety implications. The next section examines how AI technologies are currently used in maritime translation and communication.

3. AI-Assisted Tools and MT Technologies in Maritime Language Translation

As noted in Section 1, maritime language has received little attention in MT research. A few studies, however, offer useful insights into how MT performs on maritime content.

One such study is Pouliquen et al.'s (2015) paper, SMT at the International Maritime Organization: Experiences with Combining In-house Corpora with Out-of-domain Corpora. It presents TAPTA, an MT tool built for the International Maritime Organization (IMO). TAPTA translates documents among Spanish, French, Russian and Arabic, with English as an intermediary language. As a specialised UN agency, the IMO works in several languages and produces large volumes of repetitive documents. It therefore needed reliable translation solutions. The authors identify one main challenge: the IMO's in-house corpora were small, especially for Russian and Arabic. This limited the performance of statistical MT models trained only on these data. To solve the problem, the IMO was allowed to add larger parallel corpora from the UN. The authors used the Moses framework and describe how TAPTA was installed and trained, including sentence alignment and corpus filtering. Translation quality was assessed through BLEU scores and feedback from professional translators. The BLEU results were inconclusive about the benefits of combining corpora. Translators' evaluations, however, showed a clear pattern. They preferred the combined IMO-UN models for general texts and the IMO-only models for technical, domain-specific content. Pouliquen et al. (2015, 205) conclude that open-source MT can outperform commercial alternatives in some institutional contexts. They also suggest further improvements, such as automatic model selection according to document type.

A second relevant study is Y. Lu et al.'s (2025) study, *Technology-Empowered Cross-Cultural Translation Strategies for Zhoushan Marine Folklore Terms*. It examines the translation of culturally specific marine terminology. The authors point to semantic loss and to the limits of current MT, which often fails to convey the cultural nuances of marine folklore. Using terminological analysis and audience

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testing, they identify significant cultural distortions in official translations. In response, they propose a "technology empowerment–cultural adaptation" model. The model combines AI-assisted tools with standardised terminology databases to improve accuracy. Their findings show the need for solutions that preserve cultural heritage while using new technology.

These two studies deal with very different materials. One focuses on institutional, safety-critical documentation, the other on culturally embedded folklore. Together, they show both the promise and the limits of MT in maritime contexts. They also confirm that more research is needed on how current MT and LLM-based systems handle specialised maritime terminology. Industry practice confirms this need. Maritime language service providers, such as Stepes, combine subject-matter expertise, translation memory and terminology management to ensure consistency. This reflects a wider recognition in the industry: maritime translation quality depends on human expertise supported by technology, not on MT alone.

Standardised terminology, operational phraseology and legally binding documents are central to maritime communication. The stakes are especially high in regulatory instruments such as the International Convention for the Safety of Life at Sea (SOLAS), the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and the International Convention for the Prevention of Pollution from Ships (MARPOL). In these texts, accurate translation is essential for safety and regulatory compliance. Maritime translation also covers a wide range of document types. These include technical manuals, vessel operating instructions, legal contracts (e.g. bills of lading and charter parties) and institutional texts. Such documents require advanced linguistic competence and systematic terminology management.

Maritime translators rely on a range of tools. Language service providers such as TransPerfect, Lionbridge and Gengo, as well as platforms such as ProZ.com, use MT in their workflows. As Bowker and Fisher (2010) note, MT and computer-assisted translation (CAT) are best seen as points on a single continuum. They differ in the degree of human and machine involvement, rather than being entirely separate tools. CAT tools such as SDL Trados Studio, memoQ, Phrase and Across offer translation memories, terminology databases and concordance functions. These features improve consistency and reduce repetitive work (Bowker and Fisher 2010; O'Brien 2012). MT systems such as DeepL, Google Translate and Microsoft Translator are increasingly used for first drafts of repetitive technical content. LLMs such as ChatGPT and Gemini go further. They can extract terminology, build bilingual glossaries, explain context, and assist in editing and revising translations (Tawffeek 2025). However, as shown in Section 2, these systems tend to hallucinate and to apply established terminology inconsistently, so their output requires human verification and post-editing. Translators also use terminology management tools such as MultiTerm, as well as Adobe Acrobat Pro and OCR software. They often work with marine engineers, naval architects and other experts to solve complex terminological and regulatory questions. This interdisciplinary cooperation is

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essential, because linguistic accuracy in this field depends closely on technical knowledge. The maritime translator thus corresponds to what Dejica and Dejica-Cartiș (2020) call the multidimensional translator: a professional who works at the interface of technology, products and users, and who needs terminological, genre, technological and collaborative competences in addition to linguistic ones.

The IMO itself illustrates this multilingual demand. Its regulatory work depends on accurate translation into its six official languages: English, Arabic, Chinese, French, Russian and Spanish. This ensures equal access to maritime legislation. Maritime translation thus relies on hybrid workflows that combine AI, CAT tools and human expertise.

4. Methodology

To answer the research questions set out in Section 1, I adopted a qualitative, corpus-based approach. The research questions are exploratory. They require close analysis of individual translation choices in context. Purely quantitative metrics, such as BLEU scores, would not be sufficient. As shown in Section 3, BLEU scores have also proved inconclusive in evaluating MT in maritime contexts (Pouliquen et al. 2015).

4.1. Corpus

The corpus consists of two complementary types of maritime texts. Together, they cover the main registers and communicative functions of professional maritime discourse. From a genre-based perspective, which distinguishes types of specialised translation by their genres and communicative purposes (Dejica 2020, 2026c), the two texts represent different genres: a regulatory text and a controlled-language inventory of operational phrases. The first category consists of excerpts from the *International Regulations for Preventing Collisions at Sea (COLREG; International Maritime Organization 2003). COLREG is* a legally binding IMO convention that governs vessel navigation and right-of-way rules (i.e. the rules of the road at sea). I chose these texts for their highly codified, legally precise language and their reliance on standardised nautical terminology. They represent the regulatory register which is central to maritime communication. The second text is the IMO Standard Marine Communication Phrases (SMCP; International Maritime Organization 2002). The IMO SMCP is a controlled-language framework developed by the IMO to standardise ship-to-ship and ship-to-shore communication and minimise the risk of misunderstanding at sea. It is also the basis of much Maritime English training (Van Kluijven 2003). I selected the SMCP phrases for their highly formulaic structure, restricted vocabulary and safety-critical function. They offer a valuable test of MT systems' ability to preserve fixed phraseology and operational precision. The translation of COLREG and the SMCP seeks a middle ground between two approaches. The first is Newmark's (1988) semantic translation. The second is functional equivalence as defined in Skopostheorie (Reiss and Vermeer [1984] 2014). Both texts are institutional. Like many institutional texts, they are also hybrid,

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combining legal, technical and operational features, which complicates the choice of translation strategy (cf. Trosborg 1997). Their translation is therefore source-text-oriented: their content must be preserved completely and precisely. For the SMCP, however, source orientation applies to the operational content rather than to the wording: as Section 5.2 shows, the official Romanian version conveys each phrase through the established target-language command.

From COLREG, I selected two provisions for detailed analysis: Rule 18 (Responsibilities between Vessels) and Rule 12 (Sailing Vessels). They represent two core difficulties of regulatory maritime language. Rule 18 relies on legally defined vessel categories, such as *vessel not under command* and *vessel constrained by her draft*. Rule 12 relies on conventional operational phrasing, such as *keep out of the way*. The analysis of these rules is illustrative rather than exhaustive. Its aim is to identify types of translation problems and their causes, not to measure how often they occur. The SMCP data, which cover the whole of Section A2, provide a broader basis against which the COLREG observations can be checked.

4.2. MT Systems

I selected four widely used systems: Google Translate, DeepL, ChatGPT and Gemini. This selection allows a comparison between dedicated neural MT engines (Google Translate and DeepL) and systems based on large language models (ChatGPT and Gemini). As discussed in Section 2, LLM-based systems increasingly rival or surpass dedicated MT engines in specialised domains such as law and medicine (Briva-Iglesias et al. 2024; Yan et al. 2024). I used all four systems in their free, web-based versions.

I generated the translations in two rounds, in March and July 2026, with the same source texts and prompts. Only the outputs for Rule 18 differed between the two rounds. The renderings of Rule 12 and of the SMCP phrases were identical in March and July. I therefore report both rounds for Rule 18 and a single set of outputs for Rule 12 and the SMCP. These systems are updated continuously, and their free interfaces do not always show which model version is in use. The results should therefore be read as a record of how the systems performed in March and July 2026, not as a permanent assessment of their quality. The study was not designed as a longitudinal comparison. However, the differences between the two rounds proved relevant and are discussed in Section 5.1. I submitted each COLREG rule and each group of SMCP phrases separately for translation from English into Romanian. Google Translate and DeepL received the texts without any instruction, in line with their standard use. ChatGPT and Gemini can process natural-language prompts. Each text was therefore accompanied by the instruction: "Translate this text / these phrases into maritime Romanian". The aim was to activate their domain knowledge while keeping the scenario realistic. A non-specialist user might write a similar instruction. This difference in prompting reflects the different design of the two types of systems. Its possible effect on the results is discussed in Section 6.

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4.3. Evaluation Criteria

I assessed the translations qualitatively and descriptively, without a numerical rating scale. This choice follows from the exploratory nature of the research questions and the focus on close analysis in context. I used five criteria: terminological precision, semantic fidelity, contextual appropriateness, grammatical acceptability and compliance with international maritime conventions. The official Romanian versions of COLREG and the SMCP served as a benchmark for terminological and conventional accuracy. These versions are unpublished. For transparency, the relevant passages are reproduced in Tables 1a, 1b and 2, and the complete official text of SMCP Section A2 is given in the Annex. Where further interpretation was needed, the evaluation drew on my own expertise as a maritime language specialist. This expertise is based on more than a decade of teaching Maritime English at Constanța Maritime University (2005–2016) and on doctoral research devoted to the translation of maritime language (Vișan 2021a, 2021b). I carried out the evaluation alone, which ensured consistency across the corpus.

5. Results and Analysis

This section presents the results of the comparative analysis. The examples are drawn from COLREG and the SMCP. For each example, I compare the outputs of Google Translate, DeepL, ChatGPT and Gemini with the official Romanian translation. The aim is to show how each system handles the terminology, phraseology and conventions of these texts. I pay particular attention to recurring errors, but also to cases in which the systems preserved terminological precision.

Translating maritime terminology involves more than finding lexical equivalents: the translator must ensure both terminological accuracy and compliance with established conventions.

The effectiveness of AI in maritime translation depends largely on the type of text. Highly standardised documents, such as technical manuals, checklists and maintenance procedures, suit MT well. Their structures are repetitive and their terminology is stable. Other documents, such as legal texts, accident reports, correspondence and training materials, require a deeper understanding of context and intention. Here, AI may produce translations that are fluent but conceptually wrong. Both texts examined in this paper are highly standardised. Yet, as the analysis shows, standardisation alone does not guarantee reliable MT output, especially where fixed collocations and non-compositional expressions are involved.

A further difficulty concerns polysemous and context-dependent terms. As terminology theory has shown, specialised meaning does not always reside in the term itself. It often emerges from its use in a specific discourse. AI systems may choose the most statistically probable equivalent. Yet they may miss conceptual distinctions that are obvious to maritime professionals. The analysis below examines this tension, starting with COLREG (Section 5.1) and continuing with the SMCP (Section 5.2).

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5.1. COLREG Examples

To illustrate MT performance in maritime navigation, I examined the four systems' translations of selected COLREG rules. One difficulty in translating a text like COLREG, whether by a human or a machine, is that the same term must mean exactly the same thing every time it appears. This is not simply a matter of style. Sager (1990) treats terminological univocity as a basic requirement of specialised translation. Cabré (1999) makes a similar point: terms function as fixed units of meaning within a professional community, not as ordinary words open to paraphrase. Research on Romanian legal translation points in the same direction: in the language of law, the translator must decide carefully between synonymy and polysemy, since an apparently harmless synonym may alter the legal meaning (Buzarna-Tihenea 2013). In a text meant to prevent collisions at sea, the translator has no real freedom to vary the wording for elegance.

An official Romanian translation of COLREG already exists. The question I ask of the four MT outputs is therefore twofold. How close is each output to the English original? And does it respect the terminology already fixed by the official translation? Toury's (1995) notion of translational norms is useful here. The official translation sets a norm for this text type in Romanian. The MT outputs can be judged against this norm, separately from their fidelity to the source. As will become clear, all four systems handle syntax and modality reasonably well. Each, however, fails in a different way to hold onto established terminology where it matters most.

The first provision analysed is Rule 18, which sets out the responsibilities between vessels and relies on the legally defined vessel categories described in Section 4.1. Tables 1a and 1b present the outputs obtained in the two test rounds, in March and July 2026.

In March 2026, both LLMs departed from the official terminology on several points. ChatGPT translated *vessel not under command* as *navă fără guvernare*, a calque-like form. Gemini produced *navă fără comandă*, which is even closer to a word-for-word rendering. Neither matches the official term *navă care nu este stăpână pe manevră*. Both forms are semantically transparent, but maritime professionals would not readily recognise them as the codified term. ChatGPT also rendered *restricted in her ability to manoeuvre* as *capacitatea de manevră restrânsă*. The adjective *restrânsă* is close in meaning to the official *redusă*, but it is not the standard term. Gemini, by contrast, used the official *capacitate de manevră redusă*.

The most revealing term was *vessel constrained by her draft*. ChatGPT used the literal calque *constrânse de pescajul său*. Gemini's rendering, *înghesuite de pescajul său*, was the most serious error of the March round. In Romanian, *înghesuit* means *squeezed* or *crowded*. This is a clear semantic mistranslation, not a matter of register. It illustrates a typical limitation of large language models (LLMs): they tend to interpret multiword terms compositionally instead of recognising them as fixed terminological units. Interestingly, Gemini rendered *avoid impeding* as *să evite stânjenirea*, which belongs to the same word family as the official *stânjenită*. The model thus showed some terminological coherence, but not where it mattered most.

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ST: Any vessel other than a ***vessel not under command*** or a ***vessel restricted in her ability to manoeuvre*** shall, if the circumstances of the case admit, ***avoid impeding*** the safe passage of a ***vessel constrained by her draft***, ***exhibiting the signals*** in Rule 28.			
TT: Orice navă, alta decât o ***navă care nu este stăpână pe manevră*** sau ***a cărei capacitate de manevră este redusă***, trebuie, dacă circumstanţele permit, ***să nu împiedice*** trecerea în siguranţă a unei ***nave stânjenită de pescajul său***, care ***arată semnalele*** prevăzute la regula 28;			
ChatGPT	**Gemini**	**DeepL**	**Google Translate**
Orice navă, alta decât o ***navă fără guvernare*** sau o navă cu ***capacitatea de manevră restrânsă***, trebuie, dacă circumstanțele permit, ***să evite împiedicarea*** trecerii în siguranță a unei ***nave constrânse de pescajul său***, care ***arborează semnalele*** prevăzute în Regula 28	Orice navă, alta decât o ***navă fără comandă*** sau o navă cu ***capacitate de manevră redusă***, trebuie, dacă circumstanțele cazului permit, ***să evite stânjenirea*** trecerii în siguranță a unei ***nave înghesuite de pescajul său***, care ***prezintă semnalele*** prevăzute de Regula 28.	Orice navă, alta decât o ***navă care nu poate fi manevrată*** sau o navă cu ***capacitate de manevră limitată***, trebuie, dacă circumstanțele cazului o permit, ***să evite să împiedice*** trecerea în siguranță a unei ***nave constrânse de pescajul său***, ***afișând semnalele*** prevăzute în Regula 28.	Orice navă, alta decât o ***navă care nu este sub comandă*** sau o navă a cărei ***capacitate de manevră este limitată***, trebuie, dacă circumstanțele cazului permit, ***să evite să împedică*** trecerea în siguranță a unei ***nave cu pescaj limitat***, ***prezentând semnalele*** prevăzute la Regula 28.

Table 1a. Comparative Translations of COLREG Rule 18 (March 2026)

ST: Any vessel other than a ***vessel not under command*** or a ***vessel restricted in her ability to manoeuvre*** shall, if the circumstances of the case admit, ***avoid impeding*** the safe passage of a ***vessel constrained by her draft***, ***exhibiting the signals*** in Rule 28.			
TT: Orice navă, alta decât o ***navă care nu este stăpână pe manevră*** sau ***a cărei capacitate de manevră este redusă***, trebuie, dacă circumstanţele permit, ***să nu împiedice*** trecerea în siguranţă a unei ***nave stânjenită de pescajul său***, care ***arată semnalele*** prevăzute la regula 28;			
ChatGPT	**Gemini**	**DeepL**	**Google Translate**
Orice navă, alta decât o ***navă care nu este stăpână pe manevră*** sau o navă cu ***capacitatea de manevră redusă***, trebuie, dacă împrejurările cazului permit, ***să evite să stânjenească*** trecerea în siguranță a unei ***nave stingherite de pescajul său***, care ***arată semnalele*** prevăzute în Regula 28.	Orice navă, alta decât o ***navă care nu este stăpână pe manevră*** sau o navă cu ***capacitate de manevră redusă***, trebuie, dacă împrejurările cazului permit, ***să evite să stânjenească*** trecerea în siguranță a unei ***nave stingherite de pescajul său***, care ***arată semnalele*** prevăzute la Regula 28.	Orice navă, alta decât o ***navă care nu poate fi manevrată*** sau o navă cu ***capacitate de manevră limitată***, trebuie, dacă circumstanțele cazului o permit, ***să evite să împiedice*** trecerea în siguranță a unei ***nave constrânse de pescajul său***, ***afișând semnalele*** prevăzute în Regula 28.	Orice navă, alta decât o ***navă care nu este sub comandă*** sau o navă a cărei ***capacitate de manevră este limitată***, trebuie, dacă circumstanțele cazului permit, ***să evite să împedică*** trecerea în siguranță a unei ***nave cu pescaj limitat***, ***prezentând semnalele*** prevăzute la Regula 28.

Table 1b. Comparative Translations of COLREG Rule 18 (July 2026)

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ChatGPT's rendering of *exhibiting the signals* as *arborează semnalele* deserves a separate comment. The Romanian verb *a arbora* means *to hoist* and collocates mainly with flags (*a arbora pavilionul*). It does not collocate with lights. Rule 28, however, allows a vessel constrained by her draft to exhibit either three all-round red lights or a cylinder. The official *arată* covers both options, whereas *arborează* narrows the meaning of the source verb. ChatGPT's choice echoes authentic nautical usage, but it is too narrow for the rule and misses the authorised term. Gemini's *prezintă semnalele* is understandable, but less natural in Romanian maritime usage.

The July round gave a very different picture. ChatGPT and Gemini now produced almost identical translations. Both reproduce the official term *navă care nu este stăpână pe manevră*. Both render *restricted in her ability to manoeuvre* as *capacitate de manevră redusă*, in line with the official version. Both use *care arată semnalele*, the exact wording of the official text. Their only terminological departure concerns *vessel constrained by her draft*, now rendered as *navă stingherită de pescajul său*. The adjective *stingherită* is a near-synonym of the official *stânjenită*. The meaning is preserved, but the codified term is not. Both systems also render *avoid impeding* as *să evite să stânjenească*, again within the word family of the official term.

More surprisingly, on two points the July LLM outputs follow the source more closely than the official translation. First, the source text names two distinct categories of vessels: *a vessel not under command* or *a vessel restricted in her ability to manoeuvre*. The official translation reads *o navă care nu este stăpână pe manevră sau a cărei capacitate de manevră este redusă*. Because the second *navă* is omitted, the relative clause *a cărei* can be read as referring to the same vessel, and the legal distinction between the two categories is blurred. ChatGPT and Gemini repeat the noun (*sau o navă cu capacitate de manevră redusă*) and keep the two categories apart. Second, the official version renders *avoid impeding* as *să nu împiedice* and drops the verb *avoid*. The LLMs keep it (*să evite să stânjenească*). In addition, the official *a unei nave stânjenită* lacks case agreement, whereas the LLMs use the correct genitive form *stingherite*.

These observations do not mean that MT output should replace the official text, which carries legal authority. They concern syntax and grammar, not terminology. At the level of terminology, the official version remains the norm: no system reproduced *stânjenită*, and the LLMs reached the official form of *vessel not under command* only in the second round. The observations show, rather, that fidelity to the source and conformity to the target-language norm are two distinct dimensions of quality, which may diverge in the same sentence.

The contrast between the two rounds suggests how quickly LLM output can change. In Rule 18, within four months, both systems moved from calques and semantic distortions to near-official terminology. The change was selective, however: their renderings of Rule 12 and of the SMCP phrases remained identical. The two dedicated MT engines, by contrast, produced exactly the same translations in March and July, and their errors remained unchanged.

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DeepL translates *vessel not under command* as *navă care nu poate fi manevrată* (back-translated as 'a vessel that cannot be manoeuvred'). This is a contextual misinterpretation. The expression *a vessel not under command* designates a specific legal status, resulting from steering or propulsion failure. It is conceptually distinct from the restricted manoeuvrability addressed in the next clause. DeepL's choice therefore erases a legally significant distinction that both the source text and the official translation preserve. Like ChatGPT in March, DeepL renders *constrained by her draft* as *constrânse de pescajul său*. This literal translation departs from the official collocation. It does not achieve text-normative equivalence in Koller's (1992) sense, since it ignores the norms that govern the use of the term in Romanian regulatory texts.

Google Translate produces the most serious conceptual error in both rounds. It renders *vessel constrained by her draft* as *navă cu pescaj limitat* (i.e. a vessel with limited draft). The source term refers to a legal status: the vessel's freedom to navigate is restricted by the relation between its draft and the available depth of water. Google's version refers instead to a vessel with a shallow draft. The concept itself has changed. Google Translate also contains a grammatical error (*împedică* instead of *împiedice*). Its rendering of *vessel not under command* as *navă care nu este sub comandă* follows the English syntax closely. This word-for-word calque, however, has no standing in Romanian maritime usage. It does not designate the legal status defined by the rule and misses the official term entirely.

The rendering of *exhibiting the signals* also differs between the two engines. DeepL uses *afișând semnalele* and Google Translate *prezentând semnalele*. Both gerundial forms are understandable. They depart, however, from the official relative clause *care arată semnalele* and sound less natural in Romanian maritime usage.

In neither round did any system reproduce the official term *navă stânjenită de pescajul său.* In July, the two LLMs came very close with a near-synonym. DeepL kept a literal calque, and Google Translate kept a change of meaning. The term *vessel not under command* proved similarly unstable: only the LLMs, and only in July, reached the official form. This supports the view that fixed, high-stakes nautical collocations resist compositional translation. By contrast, *vessel restricted in her ability to manoeuvre* was handled reasonably well by all four systems. This suggests that more transparent, compositionally analysable terms pose fewer difficulties than fixed collocations.

The second provision analysed is Rule 12, which regulates the conduct of sailing vessels approaching one another. Table 2 presents the four outputs.

The four outputs differ in linguistic accuracy, terminological precision and adherence to the conventions of maritime legal discourse. The main points of comparison are the rendering of legal phrasing, nautical terminology and grammatical shifts, and the degree to which each system follows the official Romanian version.

All four systems conveyed the meaning of *keep out of the way of the other* (officially *să se abată din drumul celeilalte*). Each, however, chose a different near-equivalent. DeepL uses *să se dea la o parte din calea*, Google Translate *să cedeze*

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trecerea, ChatGPT *să se țină din drumul* and Gemini *să lase calea liberă*. Each system used its chosen phrase consistently across both occurrences, which shows intra-textual terminological consistency.

ST: When two sailing vessels are approaching one another, so as to involve ***risk of collision***, one of them shall ***keep out of the way of the other*** as follows: ■1) When ***each has the wind on a different side***, the vessel which has the wind on the ***port side*** shall ***keep out of the way of the other***;			
TT: Când două nave cu vele se apropie una de alta, astfel încât există ***pericolul de coliziune***, una dintre ele trebuie ***să se abată din drumul celeilalte***, după cum urmează: ■1) când navele ***primesc vântul din borduri diferite***, nava care ***primeşte vântul din babord*** trebuie ***să se abată din drumul celeilalte***;			
ChatGPT	**Gemini**	**DeepL**	**Google Translate**
Atunci când două nave cu vele se apropie una de cealaltă astfel încât există ***risc de coliziune***, una dintre ele trebuie ***să se țină din drumul celeilalte***, după cum urmează: ■ 1) Atunci când fiecare navă are ***vântul din borduri diferite***, nava care ***primește vântul din babord*** trebuie ***să se țină din drumul celeilalte*** nave	Când două nave cu vele se apropie una de alta, astfel încât există un ***risc de abordaj***, una dintre ele trebuie ***să lase calea liberă celeilalte***, după cum urmează: ■1) Când fiecare are ***vântul în alt bord***, nava care are ***vântul în bordul babord*** trebuie ***să lase calea liberă celeilalte***;	Atunci când două nave cu vele se apropie una de cealaltă, astfel încât să existe ***riscul unei coliziuni***, una dintre ele trebuie ***să se dea la o parte din calea celei de-a doua***, după cum urmează: ■1) Atunci când fiecare are ***vântul pe o parte diferită***, nava care are ***vântul pe babord*** trebuie ***să se dea la o parte din calea celei de-a doua***;	Atunci când două nave cu vele se apropie una de cealaltă, astfel încât să existe ***riscul unei coliziuni***, una dintre ele trebuie ***să cedeze trecerea celeilalte***, după cum urmează: ■1) Atunci când fiecare are ***vântul din bordure diferite***, nava care are ***vântul din bordul stâng*** trebuie ***să cedeze trecerea celeilalte***;

Table 2. Comparative Translations of COLREG Rule 12 (March and July 2026)

From a translation perspective, the official version remains the closest functional equivalent, since it reflects the established phrasing of Romanian maritime language. DeepL's rendering is colloquial. Google Translate resorts to modulation: *să cedeze trecerea* belongs to the vocabulary of road traffic (*a ceda trecerea*, 'to give way') and shifts the perspective from the manoeuvre to the right of way. Gemini offers a concise and semantically faithful version, acceptable in maritime usage, but it uses the hyperonym *cale* instead of the hyponym *drum*. ChatGPT's *să se țină din drumul* is closest in wording, but it is not an established maritime expression. The *Dicționar Maritim Englez-Român* (DMER 1982, 276), although outdated, remains a useful reference. It gives two equivalents for *to keep out of the way*: *a se da la o parte din drum* and *a lăsa drum liber altei nave*. In the official COLREG translation, *drum* refers specifically to the vessel's own course, a concrete and navigationally precise sense (cf. *drum adevărat*, 'true course'). Gemini's and DeepL's *cale* is therefore a semantic broadening, from a precise hyponym to a more general superordinate term.

BUPT

It is not wrong, but it is less precise. Out of context, *cale* could denote almost any route, including non-maritime ones, whereas in this nautical usage *drum* refers unambiguously to the vessel's course.

Further differences appear in the clause *when each has the wind on a different side* (officially *când navele primesc vântul din borduri diferite*). The official translation and ChatGPT both use *borduri diferite*. DeepL replaces the nautical noun *bord* with the general noun *parte* (*o parte diferită*). The meaning is clear, but technical precision is lost. Google Translate produces the erroneous plural *bordure*. This morphological error results from confusion between the maritime noun *bord* (plural *borduri*) and the common noun *bordură* (i.e. *kerb, border*). Gemini proposes *în alt bord*, a different but equivalent construction that is acceptable in maritime discourse, although it departs from the official wording.

The shift from the English singular *side* to the Romanian plural *borduri* in the official translation and in ChatGPT's output deserves a comment. It is an intra-system shift involving grammatical number (Catford 1965). It is motivated by target-language convention and does not change the propositional content. The official version also makes the subject explicit (*navele* for *each*), and so does ChatGPT (*fiecare navă*). The other three systems keep the pronoun *fiecare* of the source.

The systems also differ in rendering *the vessel which has the wind on the port side*. ChatGPT reproduces the official term *babord*, and DeepL also keeps it. ChatGPT, moreover, reproduces the official verb *primește vântul*, whereas the other systems use the literal *are vântul*. Google Translate replaces *babord* with *bordul stâng*. The meaning remains clear, but the precise, vessel-oriented reference of the paired terms *babord* and *tribord* is lost. Gemini writes *bordul babord*. This is accurate and common in maritime usage, though slightly more explicit than the official text.

Another difference concerns *risk of collision*. DeepL, Google Translate and ChatGPT translate *collision* as *coliziune*, as in the official version. Gemini chooses *abordaj*, a recognised maritime term for a collision between vessels. It is more specialised than *coliziune* and represents a terminological narrowing, which is acceptable in maritime usage. None of the systems, however, reproduces the official *pericolul de coliziune*; all render *risk* literally as *risc*.

These results also show different translation strategies. DeepL favours clarity and fluency but tends to replace specialised terms with general-language equivalents. Google Translate substitutes words literally and is more exposed to lexical ambiguity, as shown by *bordure* and *bordul stâng*. Gemini shows a good awareness of maritime terminology but often prefers paraphrase to established phrasing. ChatGPT comes closest to the official translation. It reproduces the specialised terminology, grammatical conventions and register most consistently. Its main departure is *să se țină din drumul* instead of the official *să se abată din drumul*. All four systems thus convey the propositional meaning of the source. They differ, however, in how well they reproduce the conventional terminology and phrasing of maritime discourse.

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5.2. SMCP Examples

The second part of the analysis concerns Section A2 of the SMCP, which contains the on-board communication phrases. The section comprises three groups: standard wheel orders (A2/1), standard engine orders (A2/2) and phrases used when a pilot is on the bridge (A2/3). These phrases differ from the COLREG provisions in one important respect. They are not normative sentences but short operational utterances, many of them orders given to the helmsman or to the engine room. As noted in Section 4.1, the SMCP is a controlled language: its phrases are meant to be used in a fixed form, and each form should carry only one meaning. Sager's (1990) requirement of terminological univocity therefore applies here even more strictly than in COLREG.

The official Romanian translation of Section A2 serves as the reference for the analysis. It renders the SMCP phrases through the established traditional language of Romanian seafarers. Many of its wheel and engine orders are therefore not literal translations. They are the conventional Romanian formulas for their English , such as *Drept aşa!*, *Schimbă cârma!*, *Liber la cârmă* and *Stop maşinile!*. In Toury's (1995) terms, the official version embodies the norms of the Romanian maritime community for this text type. An MT output may therefore be close to the English wording and still fail, if it does not reproduce the established Romanian equivalent. This distinction proves central to the SMCP data.

The SMCP outputs analysed below were identical in the March and July 2026 rounds. Tables 3 to 9 reproduce selected segments, grouped by subsection. In each table, ST stands for the English source text and TT for the official Romanian translation. All renderings are quoted exactly as produced, including their errors.

5.2.1. Standard Wheel Orders

Wheel orders are the most demanding part of the SMCP for any translator. They are extremely short, and their meaning is often non-compositional. *Meet her*, for instance, cannot be understood from the meanings of *meet* and *her*. Romanian has its own conventional equivalents for these orders, and they cannot be derived from the English wording. Even the section heading proved difficult. DeepL and Google Translate rendered *Standard wheel orders* as *Comenzi de roți standard*. In a maritime context, however, the ship's wheel is the *timonă*, not a *roată*: the plural *roți* evokes the wheels of a vehicle and has no place in helm terminology. ChatGPT and Gemini reproduced the official *Comenzi standard la cârmă*. Table 3 presents three wheel orders.

For *midships*, the official version gives the three established Romanian forms of the order: *Mijloc cârma*, *Cârmă zero* and *Cârma în ax*. ChatGPT reproduces one of them in a slightly expanded form (*Cârma la zero!*), and Google Translate's *Cârma la mijloc* is close to *Mijloc cârma*. Gemini retains the English adverb (*Cârma la amidship*), an unassimilated borrowing that has no place in Romanian helm orders.

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DeepL's *La mijlocul navei* refers to a location on board, not to a rudder position. It is therefore a mistranslation.

	A2/1.1	**A2/1.7**	**A2/1.9**
ST	Midships	Hard -a-port/starboard	Meet her
TT (official)	Mijloc cârma/ Cârmă zero/ Cârma în ax!	Bandă stânga/dreapta!	Schimbă cârma!
ChatGPT	Cârma la zero!	Cârma banda babord / tribord!	Contracârmiți!
Gemini	Cârma la amidship / Cârma la centru	Cârma in bandă la babord / tribord	Oprește ambardeele / Redresează nava
DeepL	La mijlocul navei	La babord/tribord la maxim	Întâlnește-o
Google Translate	Cârma la mijloc	Cârma maxim la babord/tribord	Oprește girația

Table 3. Comparative Translations of SMCP Wheel Orders A2/1.1, A2/1.7 and A2/1.9

For *Hard-a-port/starboard*, the official version uses the conventional helm orders *Bandă stânga/dreapta!*. In Romanian helm orders, *bandă* refers to putting the rudder hard over, to its maximum permitted angle, while *stânga/dreapta* specifies the direction of the manoeuvre. ChatGPT (*Cârma banda babord / tribord!*) and Gemini (*Cârma in bandă la babord / tribord*) retrieve the key term *bandă*. Both, however, replace *stânga/dreapta* with *babord/tribord*. Although these alternatives preserve the intended direction, they depart from the conventional Romanian helm orders and reflect the influence of the source-language terminology. ChatGPT's formulation is also syntactically awkward, whereas Gemini's is more explicit but does not reproduce the established command. Gemini additionally omits the diacritic in *în* in the output as presented. DeepL (*La babord/tribord la maxim*) and Google Translate (*Cârma maxim la babord/tribord*) use descriptive paraphrases rather than the conventional expression. Although both convey the idea of maximum rudder deflection and its direction, neither reproduces the established Romanian terminology. Google's version also presents a grammatical problem in the construction *cârma maxim*.

Meet her requires the helmsman to apply opposite rudder in order to check the swing of the ship's head produced by a previous helm order. The official equivalent is *Schimbă cârma!*. None of the MT systems reproduces it, and all four renderings are erroneous. ChatGPT's *Contracârmiți!* is formed from a verb that does not exist in Romanian: maritime Romanian has only the noun *contracârmă*. Google Translate's *Oprește girația* states the purpose of the manoeuvre rather than giving the order. Gemini offers two descriptive alternatives (e.g.: *Oprește ambardeele / Redresează nava*). The former refers to stopping a particular vessel movement, while the latter expresses the more general idea of correcting the vessel's movement. Neither, however, explicitly conveys the application of opposite rudder required by the original command. DeepL's *Întâlnește-o* is a literal translation of the English verb

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meet, disregarding its specialised nautical meaning. It therefore provides a clear example of the literal translation of a non-compositional expression, in which the ordinary lexical meaning of the source verb is retained at the expense of its context-specific operational meaning.

	A2/1.8	**A2/1.10**	**A2/1.12**
ST	Nothing to port/starboard	Steady	Steady as she goes.
TT (official)	Nimic la babord/tribord	Drept așa!	Drept așa!
ChatGPT	Nu mai cârmiți spre babord / tribord!	Mențineți cârma!	Mențineți drumul actual!
Gemini	Fără abatere la babord / tribord	Ține așa / Guvernează stabil	Ține drumul / Așa pe drum.
DeepL	Nimic la babord/tribord	Menține cursul	Menține cursul actual.
Google Translate	Nu lăsa să treacă de babord/tribord	Menține drumul	Menține drumul actual

Table 4. Comparative Translations of SMCP Wheel Orders A2/1.8, A2/1.10 and A2/1.12

The official *Nimic la babord/tribord* is the established Romanian order for *Nothing to port/starboard*. It instructs the helmsman not to let the ship's head move to port or starboard of the ordered course. DeepL reproduces it exactly. This is one of the few wheel orders in which a dedicated MT engine matches the reference, most likely because the Romanian order follows the structure of the English one. The other systems depart from it. Gemini's *Fără abatere la babord / tribord* paraphrases the meaning correctly, but it is not the established order. Google Translate's *Nu lăsa să treacă de babord/tribord* omits the point of reference, the course. ChatGPT's *Nu mai cârmiți spre babord / tribord!* narrows the meaning to rudder movement.

For both *Steady* and *Steady as she goes*, the official version uses *Drept așa!*, the traditional Romanian command. In the reference, the two English orders thus correspond to a single Romanian command, which tells the helmsman to keep the ship on her present heading. None of the MT systems reproduces it. Gemini's *Ține așa* comes closest. Google Translate (*Menține drumul* / *Menține drumul actual*) conveys the meaning with the correct nautical term *drum*, but in a descriptive rather than a conventional form. DeepL adopts a similar structure but uses *curs*, a lexical choice that may reflect source-language influence and is less consistent with the terminology of the official version. ChatGPT's *Mențineți cârma!* for *Steady* is a semantic error: holding the rudder in its current position would continue the turn rather than end it. Its rendering of *Steady as she goes* (*Mențineți drumul actual!*) is correct in meaning but, again, not the established command.

For *Ease to five/ten/fifteen/twenty*, the official version uses the elliptical *Redu la ...!*. Helm orders must be as short as possible, and the rudder is understood from the context. ChatGPT (*Reduceți cârma ... de grade!*) and Google Translate (*Redu cârma ... de grade*) are correct in meaning, but they add the noun *cârma* and the unit *grade*. This explicitation lengthens a command whose efficiency depends on brevity.

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ChatGPT also uses the plural imperative, whereas the official wheel orders use the singular. DeepL's *Redu viteza* transfers the order from the rudder to the engine, which is a serious domain error. Gemini's *Măreşte deschiderea* reverses the meaning of the order. A corrective gloss, *(Redu la...)*, follows in brackets, so the rendering contradicts itself. As with Gemini's rendering of *constrained by her draft* in the March round of Rule 18 (Section 5.1), the system does not merely approximate the term but distorts it. Here the distortion amounts to a reversal.

	A2/1.11	**A2/1.13**	**A2/1.15**
ST	Ease to five/ ten/ fifteen/ twenty	Keep the buoy/ mark/ beacon/ ... on port side/starboard side.	Finished with the wheel, no more steering
TT (official)	Redu la cinci/zece/cincisprezece / douăzeci!	Ţine geamandura/semnul/baliza .....în babord/tribord.	Liber la cârmă, nu mai guvernaţi!
ChatGPT	Reduceți cârma la cinci / zece / cincisprezece / douăzeci de grade!	Mențineți baliza / reperul / farul la babord / tribord!	Gata cu cârma! Nu mai sunt necesare comenzi de cârmă!
Gemini	Mărește deschiderea la cinci / zece / cincisprezece / douăzeci (Redu la...)	ține geamandura / marca / farul / ... la babord / tribord.	Terminat cu cârma, nu se mai guvernează.
DeepL	Redu viteza la cinci/zece/cincisprezece /douăzeci	Menține baliza/marca/farul/... pe babord/tribord.	Am terminat cu cârma, nu mai este nevoie de manevre de direcție
Google Translate	Redu cârma la cinci/ zece/ cincisprezece/ douăzeci de grade	Ține geamandura/ reperul/ baliza/ ... la babord/tribord	Am terminat cu cârma, nu se mai guvernează

Table 5. Comparative Translations of SMCP Wheel Orders A2/1.11, A2/1.13 and A2/1.15

In A2/1.13, the official version distinguishes three aids to navigation: *geamandura* (buoy), *semnul* (mark) and *baliza* (beacon), and it locates them with the idiomatic *în babord/tribord*. Google Translate comes closest to the reference terms (*geamandura/ reperul/ baliza*). ChatGPT omits the buoy and the open-list ellipsis. It also renders *beacon* as *far* (lighthouse), an over-specification also found in Gemini and DeepL. DeepL renders *buoy* as *baliza* and thus confuses two distinct aids to navigation. None of the systems reproduces the preposition *în*.

The official *Liber la cârmă, nu mai guvernaţi!* is the traditional formula for *Finished with the wheel, no more steering*. ChatGPT's *Gata cu cârma!* is colloquial, and its second clause reinterprets *no more steering* as *no more wheel orders*. Gemini's *Terminat cu cârma* is a calque, although its verb *guvernează* matches the reference. DeepL and Google Translate both begin with *Am terminat cu cârma*. This first-person statement turns an order into a declaration by the speaker, so the speech act of the reference is lost.

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5.2.2. Standard Engine Orders

The engine orders show the clearest difference between the LLM-based systems and the dedicated MT engines. Google Translate misread the section heading itself: it rendered *Standard engine orders* as *Specificații standard ale motorului* ('standard engine specifications'), so that the orders became technical data. Table 6 presents the three reduced-speed orders, and Table 7 three further orders.

	A2/2.2	**A2/2.3**	**A2/2.4**
ST	(Port / starboard engines) Half ahead/astern	(Port / starboard engines) Slow ahead/astern	(Port / starboard engines) Dead slow ahead/astern
TT (official)	(Maşinile din babord / tribord) Jumătate înainte / înapoi !	(Maşinile din babord / tribord) Încet înainte/ înapoi!	(Maşinile din babord / tribord) Foarte încet înainte / înapoi!
ChatGPT	Maşinile babord / tribord, jumătate înainte / înapoi!	Maşinile babord / tribord, încet înainte / înapoi!	Maşinile babord / tribord, foarte încet înainte / înapoi!
Gemini	(Motoarele babord / tribord) Jumătate viteză înainte / înapoi	(Motoarele babord / tribord) Viteză mică înainte / înapoi	(Motoarele babord / tribord) Foarte încet înainte / înapoi
DeepL	(Motoare la babord / tribord) Înainte/înapoi la jumătate	(Motoare la babord / tribord) Înainte/înapoi încet	(Motoare la babord / tribord) Viteză minimă înainte/înapoi
Google Translate	(Motoare babord / tribord) Viteză medie înainte / înapoi	(Motoare babord / tribord) Viteză redusă înainte / înapoi	(Motoare babord / tribord) Viteză foarte redusă înainte / înapoi

Table 6. Comparative Translations of SMCP Engine Orders A2/2.2, A2/2.3 and A2/2.4

The official version uses the conventional Romanian engine orders *Jumătate*, *Încet* and *Foarte încet*. ChatGPT reproduces all three exactly, although it removes the brackets around the optional element *(Maşinile din babord / tribord)*. Gemini matches only *Foarte încet*. Its *Jumătate viteză* and *Viteză mică* mix nominal and adverbial forms within a single series. DeepL keeps *încet* but renders *dead slow* as *Viteză minimă*. Google Translate replaces all three orders with descriptive noun phrases. Its *Viteză medie* for *half ahead* is a semantic error, since the order does not denote a medium speed. A further difference concerns the engine itself. The official version and ChatGPT use *maşina*, the conventional term for the main propulsion engine. Gemini, DeepL and Google Translate use the more general *motoare*.

For *Stop engines*, the official version uses the established order *Stop maşinile!*, with the conventional loan *stop*. None of the MT systems reproduces it. ChatGPT's *Opriți mașina babord / tribord!* replaces *stop* with a general verb, and Gemini's *Oprește motoarele* does the same. DeepL and Google Translate nominalise the order (*Oprire*), so the command becomes a label. In A2/2.6, Gemini is almost identical to the official *Toată viteza înainte / înapoi, de urgenţă!*. ChatGPT's *În caz de urgență* introduces a conditional reading. The emergency becomes a circumstance

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under which the order would apply, not the mode in which it must be executed, as in the reference.

	A2/2.5	A2/2.6	A2/2.7
ST	Stop (port/starboard) engines	Emergency full ahead / astern!	Stand by engine (Engine-room personnel fully ready to manoeuvre and bridge manned to relay engine orders.)
TT (official)	Stop maşinile!	Toată viteza înainte / înapoi, de urgenţă! [numbered A2/.6]	Pregătiţi maşina! (Personalul din compartimentul-maşină este gata pentru manevră iar comanda de navigaţie are personalul de cart corespunzător pentru transmiterea comenzilor la maşină.)
ChatGPT	Opriți mașina babord / tribord!	În caz de urgență, toată viteza înainte / înapoi!	Pregătiți mașina! [separate explanatory note: Personalul din compartimentul mașini trebuie să fie pregătit pentru manevre, iar personalul de pe puntea de comandă trebuie să fie pregătit să transmită comenzile.]
Gemini	Oprește motoarele (babord / tribord)	Toată viteza înainte / înapoi de urgență!	Pregătirea mașinilor (Personalul din compartimentul mașini este complet pregătit de manevră, iar puntea este echipată pentru a transmite ordinele la mașini).
DeepL	Oprire (motoare la babord/tribord)	Urgență: viteză maximă înainte / înapoi!	Motor în așteptare (Personalul din sala motoarelor este pe deplin pregătit să manevreze, iar puntea de comandă este ocupată pentru a transmite comenzile privind motoarele.)
Google Translate	Oprire motoare (babord / tribord)	Viteză maximă de urgență înainte / înapoi!	Pregătire motoare (Personalul din compartimentul mașini este pe deplin pregătit pentru manevră, iar puntea de comandă este ocupată pentru transmiterea comenzilor către mașini.)

Table 7. Comparative Translations of SMCP Engine Orders A2/2.5, A2/2.6 and A2/2.7

For *Stand by engine*, ChatGPT reproduces the official order *Pregătiţi maşina!*. It moves the bracketed definition, however, into a separate explanatory note. Gemini and Google Translate nominalise the order, and DeepL's *Motor în aşteptare* is a word-for-word calque of *stand by* that corresponds to no concept in Romanian maritime terminology. It neither gives an order nor names an existing engine state. Gemini also renders *bridge manned* as *puntea este echipată*. This is a double error, since *punte* denotes the deck and *echipată* means *equipped* rather than *manned*.

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5.2.3. Pilot on the Bridge

The phrases in A2/3 are longer and less formulaic than the wheel and engine orders. They consist mainly of questions and answers exchanged between the pilot and the master. Here the MT systems produce fewer serious errors. Where they depart from the reference, however, the departure usually results from a literal rendering of the English wording.

	A2/3.1.2	**A2/3.1.5**	**A2/3.1.6**
ST	Is the engine - room manned or is the engine on bridge control?	Is extra power available in an emergency?	Do you have a controllable or fixed pitch propeller?
TT (official)	Este sala maşinilor deservită de personal sau se controlează maşina din comanda de navigaţie ?	În caz de urgenţă, există mijloace suplimentare de alimentare cu energie electrică?	Aveţi elice normală sau cu pas reglabil?
ChatGPT	Compartimentul mașini este deservit de personal sau mașina este comandată de pe puntea de comandă?	Este disponibilă o putere suplimentară în caz de urgență?	Elicea este cu pas reglabil sau cu pas fix?
Gemini	Compartimentul mașini este deservit sau motorul este controlat de pe punte?	Este disponibilă putere suplimentară în caz de urgență?	Aveți elice cu pas controlabil sau cu pas fix?
DeepL	Sala mașinilor este deservită de personal sau motorul este controlat de pe punte?	Este disponibilă putere suplimentară în caz de urgență?	Aveți o elice cu pas variabil sau cu pas fix?
Google Translate	Există personal în compartimentul mașini sau motorul este comandat de pe puntea de comandă?	Este disponibilă putere suplimentară în caz de urgență?	Aveți elice cu pas variabil sau cu pas fix?

Table 8. Comparative Translations of SMCP Phrases A2/3.1.2, A2/3.1.5 and A2/3.1.6

In A2/3.1.2, the official version uses *sala maşinilor* for *engine-room* and the conventional *comanda de navigaţie* for *bridge*. DeepL reproduces *sala mașinilor*. ChatGPT and Google Translate use *compartimentul mașini* and *puntea de comandă*. These are recognised synonyms, but they differ from the reference. Gemini and DeepL render *bridge* as *punte* (deck). The same confusion recurs in both systems in A2/3.2.10, and in Gemini also in A2/2.7. This suggests a systematic problem rather than an isolated slip.

A2/3.1.5 shows how a literal rendering can miss the established meaning of a phrase. The official version renders *extra power ... in an emergency* as *mijloace suplimentare de alimentare cu energie electrică* (additional means of electrical power supply), in line with the way the question is understood in Romanian shipboard

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practice. All four MT systems render it as *putere suplimentară*. This matches the English wording, but it leaves the concept undetermined, since *putere* may refer to engine output, electrical power or capacity in general. Surface proximity to the source text therefore does not amount to equivalence here.

In A2/3.1.6, the official version uses *elice normală* for *fixed pitch propeller* and *elice cu pas reglabil* for *controllable pitch propeller*, placing the unmarked type first. ChatGPT reproduces *pas reglabil* but renders the *fixed propeller* literally as *pas fix*. DeepL and Google Translate use *pas variabil* and *pas fix*. These terms are technically transparent, but they depart from the reference terminology. Gemini's *pas controlabil* is a calque of the English adjective. A similar pattern appears in A2/3.1.11, where the official *numărul maxim de rotaţii* is replaced by the technical synonym *turație* in ChatGPT, DeepL and Google Translate. Only Gemini (*rotațiile maxime*) stays close to the reference.

	A2/3.2.5	**A2/3.2.7**	**A2/3.2.10**
ST	Is the turning effect of the propeller very strong?	What notice is required to reduce from full sea speed to manoeuvring speed?	Stand by look-out on the bridge / on the forecastle/ in the port/starboard wing.
TT (official)	Este efectul de giraţie a elicei foarte puternic?	Cât timp durează reducerea de la viteza maximă de marş la viteza de manevră ?	Vardia de pe puntea de comandă / teugă / aripa babord/tribord la post .
ChatGPT	Este foarte puternic efectul de giraţie al elicei?	Cu cât timp înainte trebuie anunțat compartimentul mașini pentru reducerea vitezei de marș la viteza de manevră?	Pregătiți un observator pe puntea de comandă / pe puntea teugă / în aripa babord / tribord a punții de comandă!
Gemini	Este efectul de giraţie al elicei foarte puternic?	Cu cât timp înainte trebuie anunțată reducerea de la viteza maximă de mare la viteza de manevră?	Asigurați cartul de observație (veghe) pe punte / pe castelul prova / înaripile de komandă babord / tribord.
DeepL	Efectul de rotire al elicei este foarte puternic?	Ce preaviz este necesar pentru a reduce viteza de navigație maximă la viteza de manevră?	Stați de veghe pe punte / pe puntea de la prova / în aripa de babord / tribord.
Google Translate	Este foarte puternic efectul de giraţie al elicei?	Ce preaviz este necesar pentru reducerea vitezei de la regimul de marș în larg la viteza de manevră?	Pregătiți un observator pe puntea de comandă / pe prova / pe aripa babord / tribord.

Table 9. Comparative Translations of SMCP Phrases A2/3.2.5, A2/3.2.7 and A2/3.2.10

In A2/3.2.5, the official version reads *efectul de giraţie a elicei*. The genitive article *a* agrees with *giraţie*, so the phrase is understood as *the effect of the propeller's turning*.

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Gemini reproduces the official word order and term. ChatGPT and Google Translate keep the term *giraţie* but use a different word order and the article *al*, which attaches the genitive to *efectul*. Both constructions are grammatical, but only Gemini's matches the reference. DeepL replaces the term *giraţie* with the general-language *rotire*, which is a terminological departure.

In A2/3.2.7, the official version asks how long the reduction from full sea speed to manoeuvring speed takes, and the answer specifies the required *timp de avizare* (notice time). It also uses the established term *viteza maximă de marş* for *full sea speed*. ChatGPT, DeepL and Google Translate render *notice* as *preaviz*. The term follows the English wording, but in Romanian it is used chiefly in legal and administrative language, especially for notice of termination. Its use here is therefore a register error. ChatGPT also adds the addressee *compartimentul maşini*. Gemini calques *full sea speed* as *viteza maximă de mare* instead of the official *viteza maximă de marş*.

A2/3.2.10 shows most clearly how the official version relies on traditional onboard terminology. It uses *vardia*, the Romanian nautical term for the look-out, and the elliptical *la post*. The result is a nominal command typical of Romanian onboard usage. None of the MT systems retrieves this form. ChatGPT and Google Translate (*Pregătiți un observator*) are semantically adequate but belong to a neutral register. ChatGPT's *puntea teugă* matches the official *teugă* for *forecastle*. DeepL's *Staţi de veghe* changes the addressee: the hearer is told to keep watch rather than to post a look-out. Gemini's output contains corrupted forms (*înaripile*, *komandă*).

Three further segments deserve brief mention. In A2/3.2.6, the official version uses *sirena* and the descriptive *dispozitivul de acţionare* for *whistle control*. Gemini and Google Translate use *sirenă* in the question, but Google Translate switches to *fluier* in the answer, and DeepL does the reverse. ChatGPT uses *fluierul navei* throughout. The English *whistle* thus pulls the systems towards the literal *fluier*, whereas the reference uses the term current on board. In A2/3.2.9, the official *semnal(e) scurt(e) / lung(i) cu sirena* keeps the same term. ChatGPT's *semnale sonore scurte / prelungite (cu fluierul navei)!* departs from it lexically and loses the optional plural. In A2/3.2.1, ChatGPT adds a politeness formula (*Vă rog să-mi puneți la dispoziție*). The reference uses the performative *Solicit*, and the SMCP deliberately avoids politeness formulas. Gemini's *Solicit fişa pilotului / datele de manevră* is the closest to the reference.

5.2.4. Summary of the SMCP Findings

Table 10 summarises the rendering of key concepts across the five versions.

Three patterns emerge from the SMCP data. First, MT errors concentrate in the wheel and engine orders. In this area, Romanian relies on conventional formulas that cannot be derived from the literal meaning of the English source. The dedicated MT engines in particular produce renderings that are meaningless (*Întâlnește-o*) or belong to the wrong domain (*Redu viteza*). This confirms the tendency observed in Section 5.1: fixed, non-compositional expressions resist compositional translation.

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Concept	TT (official)	ChatGPT	Gemini	DeepL	Google Translate
Midships	Mijloc cârma / Cârmă zero / Cârma în ax	Cârma la zero	Cârma la amidship / la centru	La mijlocul navei	Cârma la mijloc
Hard-a-port	Bandă stânga	Cârma banda babord	Cârma in bandă la babord	La babord la maxim	Cârma maxim la babord
Meet her	Schimbă cârma	Contracârmiți	Oprește ambardeele / Redresează nava	Întâlnește-o	Oprește girația
Steady	Drept așa	Mențineți cârma	Ține așa / Guvernează stabil	Menține cursul	Menține drumul
Half ahead	Jumătate înainte	jumătate înainte	Jumătate viteză înainte	Înainte la jumătate	Viteză medie înainte
Engine	mașina	mașina	motorul	motorul	motorul
Bridge	comanda de navigație / puntea de comandă	puntea de comandă	punte	punte / puntea de comandă	puntea de comandă
Extra power	mijloace suplimentare de alimentare cu energie electrică	putere suplimentară	putere suplimentară	putere suplimentară	putere suplimentară
Whistle	sirena	fluierul	sirena (fluierul)	fluierul / sirena	sirena / fluierul
Look-out	vardia	observator	cartul de observație (veghe)	(stați de veghe)	observator

Table 10. Rendering of Key Concepts in SMCP Section A2

Second, ChatGPT shows the highest degree of convergence with the reference. It reproduces the conventional engine orders and *Pregătiţi maşina!* exactly, and it retrieves terms such as *bandă*, *pas reglabil*, *giraţie* and *teugă*. Its errors are nevertheless significant. It mistranslates *Steady* and *Meet her*, coining the non-existent verb *contracârmi*, omits the buoy in A2/1.13, reads the emergency order conditionally and adds politeness and explanatory material absent from the reference. As in Section 5.1, the LLM-based system comes closest to the institutional norm without reaching it.

Third, closeness to the English wording is not a reliable indicator of translation quality in the SMCP. In several segments, the MT output follows the source more literally than the official version: *Steady* and *Steady as she goes*, *Ease to*, *extra power*, *notice* and *whistle*. In each case, the official version uses the equivalent established in Romanian maritime practice, and the literal rendering misses it. The official

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translation is thus the norm, in Toury's (1995) sense, against which the adequacy of MT output must be measured. An MT system that reproduces the English structure but not the Romanian convention produces a text that is comprehensible but not usable as standard maritime communication.

5.3. Summary of Results

Table 11 summarises how each system rendered a selection of key items from both texts. I assigned each rendering to one of three categories. O marks the official form. V marks an acceptable variant, which preserves the meaning but departs from the official term or command. E marks an error: a rendering that changes the meaning, belongs to the wrong domain or has no meaning in Romanian maritime usage. For Rule 18, I classified the July outputs. The classification condenses the qualitative analysis of Sections 5.1 and 5.2. It is a summary of that analysis, not a statistical measure. The items were chosen because they represent the main terminological difficulties discussed in Sections 5.1 and 5.2. They are not an exhaustive list. Sections 5.1 and 5.2, and the full corpus in the Annex, contain further errors, such as grammatical errors, calques and inconsistencies within question–answer pairs. The totals in Table 11 therefore understate the number of errors in the MT output.

Item	ChatGPT	Gemini	DeepL	Google Translate
COLREG (Rule 18, July round; Rule 12)				
vessel not under command	O	O	E	E
vessel restricted in her ability to manoeuvre	O	O	V	V
vessel constrained by her draft	V	V	V	E
exhibiting the signals	O	O	V	V
keep out of the way	V	V	V	V
on a different side	O	V	V	E
on the port side	O	V	O	V
risk of collision	V	V	V	V
SMCP (Section A2)				
Midships	V	E	E	V
Hard-a-port/starboard	V	V	V	V
Meet her	E	E	E	E
Nothing to port/starboard	V	V	O	V
Steady	E	V	V	V
Ease to ...	V	E	E	V
Half ahead/astern	O	V	V	E
Stop engines	V	V	V	V
Stand by engine	O	V	E	V
bridge (A2/3.1.2)	V	E	E	V
look-out (A2/3.2.10)	V	E	E	V
Total: Official form (O)	**7**	**3**	**2**	**0**
Total: Acceptable variant (V)	**10**	**11**	**10**	**14**
Total: Error (E)	**2**	**5**	**7**	**5**

Table 11. Classification of Key Renderings by System (O = official form, V = acceptable variant, E = error)

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The classification confirms the tendencies described above. ChatGPT reproduced the official form most often (7 of 19 items) and made the fewest errors (2). Gemini produced 3 official forms and 5 errors, and DeepL 2 official forms and 7 errors. Google Translate produced no official forms and 5 errors. *Meet her* was the only item that all four systems rendered erroneously. The large number of acceptable variants in all four columns is equally telling. Most MT renderings preserve the meaning of the source, but they do not reproduce the established Romanian term or command. In a field governed by standardised terminology, this is precisely the gap that separates a comprehensible translation from a usable one.

6. Limitations of the Study

The findings of this study should be read in the light of several limitations. First, the corpus is limited to excerpts from COLREG and the SMCP. Although these documents are authoritative sources of maritime terminology and controlled phraseology, they do not cover the full range of maritime discourse. The results are therefore representative of the selected genres rather than of maritime translation as a whole. Within COLREG, moreover, the analysis in this paper is limited to two provisions, Rules 12 and 18, owing to space constraints. The patterns identified in these rules are consistent with the SMCP findings, but a larger sample of rules would be needed to confirm them.

Second, each system produced a single output per text in each round. LLM-based systems may give different answers to the same prompt, so a single output is a snapshot rather than a stable measure of performance. Only Rule 18 changed between the March and July rounds, so the comparison between them rests on a single provision and should be read as indicative rather than conclusive. In addition, the LLMs received an instruction to translate into maritime Romanian, whereas the NMT engines did not (Section 4.2). This instruction may have contributed to the better terminological performance of the LLMs.

Third, the evaluation was qualitative, and I carried it out manually and alone, on the basis of linguistic and domain-specific criteria. This approach allowed a detailed analysis that automatic metrics could not have provided. It relies, however, on expert judgement, it was not checked by inter-rater reliability measures, and it does not yield statistically generalisable results. The classification in Table 11 summarises the analysis but does not replace a quantitative evaluation.

Fourth, the study was limited to the English- Romanian language pair. Romanian is a relevant case, since official Romanian translations of the IMO texts are available and its maritime terminology is well established. Further research on other language pairs is needed to determine whether the patterns identified here are language-specific or reflect more general tendencies in AI-assisted maritime translation.

Finally, I evaluated the MT outputs against the official Romanian translations rather than against translations produced independently by maritime translators. The

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official versions are the normative reference for standardised maritime terminology. Future research could nevertheless compare MT output with human translations and post-edited texts, in order to clarify the role of AI in professional maritime translation workflows. Despite these limitations, the study offers new empirical evidence on the performance of current MT systems in a specialised and safety-critical domain.

7. Conclusion

Neural machine translation (NMT) and large language models (LLMs) have made considerable progress. The findings of this study suggest, however, that current MT technologies still struggle with maritime terminology, particularly with fixed collocations, multiword terms and non-compositional expressions. The comparative analysis of the COLREG and SMCP texts examined leads to four main conclusions. They should be read within the limits of the sample described in Section 6.

First, in the texts examined, LLM-based systems reproduced codified terminology more reliably than dedicated MT engines. In the July round, ChatGPT and Gemini reproduced most of the official terminology of Rule 18, and ChatGPT came closest to the official Romanian versions of both COLREG and the SMCP. DeepL and Google Translate produced identical translations of Rule 18 in both rounds, including their errors.

Second, LLM output appears to be unstable. In Rule 18, within four months, ChatGPT and Gemini moved from calques and semantic distortions, such as Gemini's *înghesuite de pescajul său*, to near-official terminology, while their renderings of Rule 12 and the SMCP remained unchanged. This volatility is welcome when the models improve. It also means, however, that their output cannot be treated as a stable terminological resource.

Third, none of the four systems handled fixed, non-compositional expressions consistently. No system reproduced the official term *navă stânjenită de pescajul său.* In the SMCP, the wheel and engine orders produced renderings that were meaningless (*Întâlnește-o* for *Meet her*), belonged to the wrong domain (*Redu viteza* for *Ease to*) or reversed the meaning of the order (*Mărește deschiderea*). In a safety-critical context, such errors are not stylistic flaws but potential sources of misunderstanding. The difficulties were also greater in the operational text than in the regulatory one. Among the items classified in Table 11, 4 errors occurred in the COLREG items and 15 in the SMCP items, 11 of them in the wheel and engine orders. The full corpus contains further errors of both kinds.

Fourth, closeness to the English wording is not a reliable measure of quality. In Rule 18, the July LLM outputs preserved two syntactic distinctions more faithfully than the official translation. At the level of terminology and phraseology, however, the official versions remain the norm. This is especially clear in the SMCP, where the official Romanian translation relies on the established command language of Romanian seafarers, which no MT system reproduced consistently.

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Closing the gap between current MT performance and the demands of professional maritime translation will require sustained effort from researchers and developers alike. Three directions seem particularly promising. First, specialised maritime databases and terminology resources, of the kind piloted by Pouliquen et al. (2015) for the IMO, could give MT systems access to the non-compositional terms that proved 'lost' in this study. Second, improved contextual algorithms could help systems recognise multiword terms and standard orders as fixed units rather than translating them compositionally. Third, structured feedback from maritime professionals, integrated into human-in-the-loop workflows (Yang et al. 2023), could correct recurring errors and make terminological choices more stable over time. These directions also concern translator training. Future maritime translators need to learn how to evaluate MT and LLM output critically. Recent research on technical translation pedagogy in Romanian universities has begun to examine how such competences, and the use of technology in training, are developed (Dejica and Grigoraș 2025, 2026; Sărmașiu 2026). Interviews with professional translators likewise reveal a gap between academic training and professional requirements, particularly in post-editing and translation quality assessment (Kovacs and Dejica 2026).

Consequently, the answer to the question *Lost at Sea or Found by AI?* lies closer to the former. Maritime terminology remains a domain in which human expertise and professional judgement are indispensable. As industry professionals have noted, digital solutions often fail to reflect the operational realities of shipboard environments, and many maritime terms cannot be translated through a purely linguistic approach, because their meaning is embedded in maritime operations. Although AI has expanded the possibilities of multilingual communication, its application in maritime translation is still limited by a lack of deep domain understanding. MT can serve as a valuable support tool, but it cannot yet replace the precision and reliability that this specialised field demands.

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