

# On Representing Special Languages with FLBC: Message Markers and Reference Fixing in SeaSpeak

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**Abstract.** SeaSpeak is “English for maritime communications.” It is a restricted, specially-designed dialect of English used in merchant shipping and accepted as an international standard. This paper discusses, in the context of SeaSpeak, two key problems in the formalization of any such restricted, specially-designed language, viz., representing the illocutionary force structure of the messages, and formalization of such reference-fixing devices from ordinary language as pointing and use of demonstratives. The paper conducts the analysis in terms of Kimbrough’s FLBC agent communication language.

## 1 Introduction

SeaSpeak is known as “English for maritime communications.” It is the language of merchant shipping, a restricted, artificial, specially-developed, English-like language adopted in 1988 by the International Maritime Organization (IMO) of the United Nations for use in ship-to-ship and ship-to-shore communications. Part of the significance of SeaSpeak’s success is that it demonstrates the value and use of specially-built artificial languages. The question then naturally arises of whether a designed special language might be fully formalized and used in machine-to-machine or human-to-machine communication. We have been intrigued by such possibilities and in consequence have been investigating SeaSpeak to this end.<sup>1</sup> In what follows we focus on two aspects of the larger programme of formalizing special languages:

- Illocutionary forces
- Reference fixing

These aspects of language, discussed in detail herein, are quite common. They occur in SeaSpeak, but also in nearly any special language that will be interesting. Our chosen vehicle of formalization, Kimbrough’s FLBC, is also a

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<sup>1</sup> [KLPY03,KY04]

special case. SeaSpeak and its ilk present an important test challenge for *any* agent communications language (ACL, of which FLBC is an instance). We shall present evidence in the form of analysis that indeed FLBC is adequate to the problems of representing illocutionary forces and fixing reference in SeaSpeak. The exercise and the lessons learned will apply in general to ACLs.

That is the overview. Details begin in the next section with some background on special languages.

## 2 Special Languages

Language enables communication. Languages inhibit it, for communication requires a common language and the cost of learning multiple languages raises an often unsurmounted barrier. Having a *lingua franca*, a general language known universally, would afford universal communication. At various times and places certain natural languages, such as Greek, Latin, Mandarin, and French, have approximated universal communication vehicles.

Today English in some form appears headed towards being the universal language of commerce and affairs. The fact remains, however, that universal proficiency in English is not around the corner. Further, even with universal fluency in English there are, and will always be, realms of discourse for which precise and accurate communication is required concerning specialized topics. It is not enough to have basic knowledge of English if the purpose of communication is air traffic control, navigation, law enforcement, and so on. In these and many other realms of discourse there exist specialized concepts and vocabulary that have to be mastered in the interests of efficient and effective communication. General fluency in English is not sufficient. Neither is it necessary.

*Special languages* can in principle be created that are relatively easy to learn and that are sufficiently expressive for particular purposes. They need be mastered only by a given community of interest. This idea has had an extensive history and considerable uptake, and it goes by a number of names. Including *planned languages*, the literature uses a number of other terms and recognizes a number of related concepts:<sup>2</sup>

artificial languages, constructed languages (conlangs), invented languages, imaginary languages, fictional languages, etc., including universal languages, auxiliary languages, interlanguages or interlinguas, international languages; and also including logical languages, number languages, symbolic languages, etc. [Har02]

as well as others, including *restricted languages*, *designed languages*, and *sub-languages*.

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<sup>2</sup> Many of these terms denote different, albeit related, concepts. We shall use *special language* as an umbrella term.