Chapter 16

DESIGNING SPACE SYSTEMS IN MULTI-VIEWPOINTS SEMIOTICS

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Abstract: In this paper we examine how complex objects such as space systems can be apprehended by a semiotic approach. Instead of considering this system from a functional point of view or from an economical one etc., we chose to consider the system just as a signifying object whose meaning is to be a space system whatever the point of view we select. We are therefore led to propose multi-viewpoints semiotics to analyse and specify the conditions which allows virtual views of the systems to correspond to one and the same object. We introduce the concept of identity in order to formulate such conditions. Epistemological justifications are proposed.

Key words: Viewpoints, semiotics, design, negotiation, space system

1. INTRODUCTION

In designing business or IT systems a difficult task for the designers who co-operate is to find a common framework where they can efficiently share their knowledge on the same problem. Instead of considering the system they design from a single point of view (e.g. from a functional point of view or from an economical one) we could prefer to consider the system just as a signifying object compatible with all the viewpoints involved in the designing activity (see Galarreta et al., 1998). That means that we should use a semiotic framework in order to describe our system. But this framework should accept different ways to apprehend the IT system. Instead of considering that these different ways can be arranged in IT system ways, Formal IS ways and Informal IS ways, we prefer to postulate that each way integrates IT system features, Formal IS features and Informal IS features.
This overall ability to describe (even partly) an Information System is typical of what we define as a viewpoint. In contrast with the standard approach of Organisational Semiotics, we do not use a triadic model of the sign. We prefer to start from semiotic of the discourse which favours the *discourse* rather than the *sign* properly speaking.

In the case of the designing of space systems which can be considered as an IT system, there are additional difficulties to take into account since (a) such systems are ultimately inaccessible for validation because of their location and size, (b) these systems involve large communities which are composed of people with different competencies, located in different places.

From the semiotic point of view we adopt here, the question of the semiotic existence of such a system will be examined. To what extent does a space system exist as far as semiotics is concerned? How virtual existences postulated by the different designers (we can also include the users) can match together in order to correspond to one and a same system?

These questions will naturally lead us to examine epistemological issues in relation to them.

2. **MULTI-VIEWPOINT SEMIOTICS**

Let us recall the basic assumptions of a Multi-viewpoint semiotics\(^{20}\)

Experiences of projects of realisations of complex systems such as space systems clearly demonstrate the co-existence of specialised languages which are partly impermeable in relation to each other. These languages correspond to the different crafts that are needed during the space project.

These crafts confront each other over the definition –requirement, design, or realisation – of technical objects that are not *apriori* given, but, on the contrary, progressively built up through the negotiation of the meaning they should have to satisfy their requirements. In other words these objects are – at least before their creation, but also after it – semiotic objects belonging to different signifying sets (e.g. thermal, electrical, mechanical representations) likely to be grasped, informed and articulated by a semiotic theory.

The negotiation of meaning, which takes place during the definition of an object of this type, is the work of individuals involved in the project, and is not a pre-existing product of these languages as virtually contained in them. At the same time, the individuals internalise the natural language that they have not built and whose rules they have to observe. In order to account for

\(^{20}\) In the following paragraphs we quote ourselves from Galarreta (2002) and we hope, with slight improvements.