for ensuring the consistency and interoperability of this information and different types of activities that use this information, it is proposed to use an ontological approach based on the representation of information in the form of semantic networks (knowledge graphs);
- An agent-based approach is proposed as tools for retrieving already existing information, reusing it for problem solving and accumulating it from various information sources;
- Semantic user interfaces using ontological, grapho-dynamic and agent-based approaches are proposed as means to realise personalised representation and transfer of information.

Such an information resource can be realised in the form of an ***Electronic glossary*** for all available spheres of human activity in society. In the traditional sense, such a glossary can be a dictionary of highly specialised concepts and their terms in various subject domains, the text of which will be clear to the end user. In a broader sense, such a glossary will be understood as a system or subsystem with the help of which:

- you can quickly find quickly find already existing information: concepts, their terms, definitions, connections with other concepts, and so on;
- reuse reuse information by both humans and computer systems that know how to communicate with this glossary;
- accumulate information, i.e. new information from various sources can be entered both manually and automatically;
- information can be visualised depending on the user's learning level.

The ***OSTIS Technology*** is proposed to be used as a technology that allows to realise such systems and has all the necessary methods and means for their implementation. The *OSTIS Technology* is an open semantic technology of complex life cycle support of semantically interoperable intelligent computer systems of new generation. The purposefulness of using this technology is determined by the tasks that can be solved with the help of this technology, and the high level of scientific problem, which is aimed at solving this technology.

The *OSTIS Technology* is known for its basic principles [34], [35], [36]:

- all knowledge is described by means of a unified knowledge representation language — *SC-code*, which ensures syntactic and semantic interoperability of this knowledge and makes it possible to interpret knowledge not only by humans but also by computer systems;
- All knowledge is structured by means of a hierarchy of subject domains and their corresponding ontologies, through which the consistency of this knowledge is ensured;
- knowledge processing of various kinds is based on the principles of graphodynamic models, with the help of which it is possible to understand the meaning of this knowledge efficiently and flexibly;
- all knowledge is accumulated in the form of semantically powerful libraries of reusable components, with the help of which the reuse of already existing knowledge in problem solving is realised;
- all knowledge is open and transparent in use and modification by both humans and systems.

*SC-code* is the main internal formal universal abstract language for representing information constructs in ostis-systems. *SC-code* supports various data types, including numbers, strings, lists and other data structures. It also provides facilities for working with knowledge bases and performing logical operations. There are 3 main external languages of ostis-systems: SCs-code, SCn-code and SCg-code [37]. They provide a way for ostis-systems to communicate with their users and other ostis-systems.

This technology is considered to be a new generation technology. And in the context of the *OSTIS Technology*, all computer systems, in particular intelligent systems, developed on the basis of this technology are called new generation intelligent systems or ostis-systems. The *OSTIS Technology* is realised in the form of a special ostis-system, which is called the *OSTIS Metasystem* [38] and the knowledge base, which this system contains:

- The formal theory of ostis-systems;
- The standard of ostis-systems (standard of ostis-systems knowledge bases, ostis-systems problem solvers, ostis-systems interfaces);
- The standard of methods and tools for ostis-systems life cycle support (the core of the Library of reusable ostis-system components (the OSTIS Library), methods for supporting the life cycle of ostis-systems and their components, tools for supporting the life cycle of ostis-systems).

*The OSTIS Standard* defines general principles and rules for the development and use of knowledge bases and intelligent systems based on the *OSTIS Technology*.It defines the structure of knowledge bases, data formats, ways of knowledge organisation and other aspects that should be taken into account when developing intelligent systems based on the *OSTIS Technology*. In addition, the *OSTIS Standard* defines the rules of organisation and representation of knowledge in knowledge bases. The *OSTIS Standard* helps to ensure interoperability and uniformity within the projects using the *OSTIS Technology* and provides convenience for developers and researchers to work together.

In the context of this paper, the *OSTIS Metasystem* [38], [39] attracts attention because it is some computer version of the *OSTIS Standard*, additionally implementing tools for processing, visualising and us-

ing this standard, the aim of which is to provide a consistent and compatible activity both for the development of intelligent systems and for the improvement of methods, models and tools for their development, which is a subobjective of the Electronic glossary conceived by this work.

In addition, all ostis-systems are combined to form an integrated ecosystem — the *OSTIS Ecosystem* [40], containing knowledge from all subject domains of society in a consistent, semantically interoperable and understandable form. If we compare the Electronic glossary and the *OSTIS Ecosystem*, it is obvious that the Electronic glossary is a variant of the *OSTIS Ecosystem* knowledge base. However, in the context of this work, it is more appropriate to specify the Electronic glossary to the glossary, which is a variant of displaying the *OSTIS Standard*, because if we consider the Electronic glossary as a variant of displaying the knowledge base of the *OSTIS Ecosystem*, it is necessary in this work to focus in more detail not on the principles of structuring information in this glossary, but on the principles of coordination of information from different subject domains, which are united in the form of a single knowledge base of the *OSTIS Ecosystem* and which is the subject of the *OSTIS Standard*.

Also due to the identified dependence of the Electronic glossary on the *OSTIS Standard* and the *OSTIS Technology* as a whole, we will refer to this Electronic glossary as the ***OSTIS Glossary***. And also it is important to understand that in this case the *OSTIS Glossary* is not some separate ostis-system, but is a form of display of the *OSTIS Standard*, its part, visualised according to certain formalised rules, and by virtue of this it is also a part of the knowledge base of the *OSTIS Metasystem*, to which it is possible to ask various questions.

Therefore, in the following sections, besides the content of the conceived the *OSTIS Glossary*, the rules of its development, visualisation and tools for working with it will be described in detail. That is, in this paper it is important to fulfil the following tasks:

- describe and fix the principles and rules of development and consistency of the *OSTIS Glossary* fragments both with itself and with the *OSTIS Standard*;
- describe and fix the rules of placement, structuring, identification of concepts and fragments of concepts in the *OSTIS Glossary*;
- describe and fix the principles of interaction of users and systems with the *OSTIS Glossary* and the rules of visualisation of concepts and fragments of concepts in it;
- he current structure of the *OSTIS Glossary*.

Further on we will consider in detail the principles of consistency of the *OSTIS Glossary* and the *OSTIS Standard*, the rules of structuring and specification of *OSTIS Glossary* objects, as well as the rules of identification of these objects within the *OSTIS Glossary*.

### *B. Principles of consistency of the OSTIS Glossary and the OSTIS Standard*

As stated earlier, the *OSTIS Glossary* is closely related to the *OSTIS Standard*. This is due to the following reasons, which at the same time are the **basic principles for the development of the OSTIS Glossary**, consistency of its text with itself and the text of the *OSTIS Standard*:

- The *OSTIS Glossary* is not a separate knowledge base or ostis-system. On the contrary, the *OSTIS Glossary* is a semantically compatible and ordered fragment of the *OSTIS Standard*, some variant of its display, which describes with sufficient detail the entities and concepts used in Artificial Intelligence and, in particular, *OSTIS Technologies*, as well as the relations between them, references to bibliographic sources and authors of these entities and concepts. The *OSTIS Glossary* is the result of a collective consistency of terms both within the *OSTIS Technology* and across Artificial Intelligence.
- In addition to the *OSTIS Glossary*, an important component of the *OSTIS Standard* is the *OSTIS Bibliography*. The *OSTIS Bibliography* is a list of the literature used in the *OSTIS Standard*. The *OSTIS Bibliography* is the result of the analysis of other works and analogues studied during the development of the *OSTIS Technology* and includes brief bibliographic descriptions of both other technologies similar to the *OSTIS Technology* and the technologies, models and tools on which the *OSTIS Technology* itself is based.
- Consequently, the key objects of description in the Glossary may be:
  - concepts (absolute and relative);
  - specific entities that are not concepts, e.g. specific systems, projects, technologies, languages, etc. (the *OSTIS Ecosystem* [40], the *OSTIS Metasystem*, Neo4j Project, RDF Language);
  - specific individuals;
  - specific bibliographic sources (books, articles, electronic resources).
- The *OSTIS Glossary* is not a static structure stored in the knowledge base of the *OSTIS Metasystem*. It is the result of the work of some collective of agents transforming the hierarchy of sections of the *OSTIS Standard* into some simplified from the reader's point of view hierarchy of sections, in which concepts are ordered lexicographically rather than logically, i.e. the *OSTIS Glossary* can be formed by means of explicit or indirect start of a non-atomic agent consisting of agents: forming a particular section of this glossary, concatenation of glossary

sections, filtering of concepts and their specifications according to given criteria, and so on.

- Since the *OSTIS Glossary* is some fragment of the knowledge base of the *OSTIS Metasystem*, it is more appropriate to develop it by the same means that are used to develop any knowledge base of the ostissystem. From this point of view, the development of the *OSTIS Glossary* is reduced to the development of the knowledge base of the *OSTIS Metasystem*, including the *OSTIS Standard*, already loaded in this knowledge base. Thus, manual transformation of the *OSTIS Standard* into the *OSTIS Glossary* is not required and is automated by existing ostissystem knowledge base development tools.
- For visualisation of the *OSTIS Glossary* the existing tools for development of ostis-systems knowledge bases are sufficient. Viewing of the *OSTIS Glossary* from the whole knowledge base of the *OSTIS Metasystem* should be done with the help of a specialised agent. Such an agent should allow to display it in one of the external sc-languages (SCn-code, or SCg-code).

In other words, the OSTIS Glossary should not be some other text describing the current state of the OSTIS Technology, on the contrary, the Glossary should be consistent and semantically interoperable with the OSTIS Standard and should be only some form of its presentation, simplified for the reader, reducing the threshold for new people to enter the OSTIS Technology, allowing to quickly find concepts and agree new ones.

### *C. Rules for structuring and specification of the OSTIS Glossary objects*

The main purpose of the *OSTIS Glossary* is to present concise specifications of the *OSTIS Standard* concepts in an organised form, simplified for the reader. The text of the *OSTIS Standard* is presented in the form of a sequence of ordered and organised sections of subject domains and ontologies containing a logical statement of the specifications of the objects considered within the *OSTIS Technology*. The *OSTIS Standard* is based on the ***following principles of text structuring***:

- The *OSTIS Standard* is the main part of the knowledge base of the *OSTIS Metasystem* and is a description of the current state of the *OSTIS Technology*.
- As a formal language for the external representation of the *OSTIS Standard*, SCn-code, which is an external form of *SC-code* representation, is used.
- The *OSTIS Standard* is ontologically structured, i.e. it is a hierarchical system of related formal subject domains and their corresponding formal ontologies, thus ensuring a high level of stratification of the *OSTIS Standard*.
- Each subject domain can be matched:
  - a family of corresponding ontologies of different kinds;
  - a set of semantic neighbourhoods describing the research objects of this subject domain.

  subject domains are the basis for structuring the sense space, a means of localisation, focusing attention on the properties of the most important classes of described entities, which become classes of objects of research in subject domains.
- Each concept used in the *OSTIS Standard* has its own place within this standard, its own subject domain and its corresponding ontology, where this concept is investigated in detail, where all the basic information about this concept and its various properties is concentrated.
- The *OSTIS Standard* also includes files of information constructs that are not *SC-code* constructs (including sc-texts belonging to different natural languages). Such files allow to formally describe in the knowledge base the syntax and semantics of various external languages, and also allow to include in the knowledge base various explanations, notes addressed directly to users and helping them to understand the formal text of the knowledge base.
- From a semantic point of view, the *OSTIS Standard* is a large refined semantic network, which is nonlinear in nature and which includes signs of all kinds of described entities (material entities, abstract entities, concepts, relations, structures) and, accordingly, contains links between all these kinds of entities (in particular, links between links, links between structures).
- The *OSTIS Standard* is a hierarchical system of subject domains and their corresponding ontologies specifying these subject domains. Each of the subject domains describes the corresponding classes of research objects with the maximum possible degree of detail defined by a set of relations and parameters defined on the classes of research objects.
- Each section of the *OSTIS Standard* contains the knowledge that is part of the subject domain and ontology that is either fully represented by the specified section or partially represented by the specification of one or more specific objects of study.
- The specification of each subject domain and each section should have a sufficient degree of completeness. At a minimum, the role of each concept used in each subject domain should be specified.

Since the *OSTIS Glossary* is nothing but a part of the —textitOSTIS Standard, the structuring principles of the *OSTIS Glossary* are the same as the structuring principles of the *OSTIS Standard*. The exception is that the structuring of the *OSTIS Glossary* should happen automatically, by some agent generating a structure corresponding to this.