CWP/19/2(D)

E

July 2001

منظمة الأغذية والزراعة للأمم المتحدة | 联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Organización de las Naciones Unidas para la Agricultura y la Alimentación

COORDINATING WORKING PARTY ON FISHERY STATITICS

Ninetheenth Session

Nouméa, New Caledonia, 10-13 July 2001

FIGIS: State of development and proposals for future implementation

FIGIS: State of development and proposals for future implementation

Management Summary

Author	Marc Taconet
Version	version number 1.1
Project	FIGIS
Distribution	Participants to the FIGIS meeting in Noumea, 9th July 2001
Created	02 July 2001 15:55
Saved	00 XXX 0000 00:00
Printed	06 July 2001 14:54

Revision History		
Date	**Author**	**Summary**
02/07/01	Richard Grainger	Version 1.1

FIGIS: STATE OF DEVELOPMENT AND PROPOSALS FOR FUTURE IMPLEMENTATION

1. INTRODUCTION :

The Development of FIGIS, a Project in support to FI Department Regular programme, began on January 1999, for a 5 years duration. In addition to FI Dpt Reg Prg budget, it is developed in collaboration with the FAO World Agricultural Information Center (WAICENT), and financially supported by two donors : Japan and France

What FIGIS is :
FIGIS is a global information system on fisheries aimed at providing policy makers with timely, reliable strategic information on fishery status and trends on a global scale. Designed as a policy-based information system, it will enable policy makers to make informed decisions about the key challenges of sustainable development, and will support their shifting towards sustainability-centred management by providing them with a single entry point to strategic data, information, analyses and reviews of fisheries issues and trends. Integrating a galaxy of more technically specialized sub-systems, FIGIS will as well allow the user to access a variety of domains including biology, fishing technology, high seas vessels record, resources, fisheries, management systems, aquaculture, products, and markets. While organised in a data base, this information is presented in the form of fact sheets illustrated by maps, images, and statistical graphics constructed from available time series, and published via the internet, through CD-ROMs and in publications.

A key principle of FIGIS is that of ensuring that the provision of information is sustainable and that information is quality-controlled and maintained up-to-date. FIGIS's maintenance will rely upon a network of partners (initially Regional Fishery Bodies and National Centres of Excellence) contributing to the system according to their own mandate. As a corollary, the system's control is decentralised : contribution and maintenance rights are assigned to FIGIS partners who are the data owners, these partners having to share certain standards and adhere to certain rules aimed at ensuring the best possible quality of data and information. It's worth noticing that the new internet technologies will ensure systematic integration through streamlined flows of information from national, to regional and to global levels with no major additional workload, except during the development phase.

For effective fisheries information management, FIGIS Partners need to promote and agree on standards: thesauri with agreed vocabularies and classifications for indexing, glossaries to ensure definitions of terms, and shared concepts. Norms for data sets content management are under development, including documentation of information quality assurance processes. FIGIS refers to the Dublin core XML Metadata standard to set up its own proposal for a Fisheries XML information standard.

What FIRMS is :

FIGIS addresses too broad a variety of information domains to be manageable as a whole. A Partnership and its related mode of working need to be identified based on families of

partners sharing same concerns and philosophy. FIGIS (to be understood as a tool) will thus have to respond to the requirements set by institutionalised sub-systems. FIRMS, the Fishery Resources Monitoring System, is planned to be one of those sub-systems, bringing within a unified partnership International Organisations, Regional Fishery Bodies and National Centers of Excellence willing to report on marine fisheries status and trends.

Thus, the FIRMS system includes core modules namely the Species, Resources, Fisheries, and Fisheries Management systems domains of information, and peripheral ones like Fishing Technology, and Vessels. Being a satellite of FIGIS (the Fisheries Global Information System), FIRMS will be connected to the other specialized sub-systems under FIGIS umbrella, such as Aquaculture, Trade and Marketing, and Research.

Being a distributed information system, FIRMS will allow states to fulfil their reporting obligations according to international requirements.

2. BRIEF PRESENTATION OF THE FIGIS SYSTEM

FIGIS has to be understood as a process which one can compare to a factory. This chapter presents first the factory outputs (the dissemination system), then which are the factory inputs and how they can be organised to lead to these outputs.

2.1 FIGIS dissemination system

In order to target a variety of audiences, FIGIS is structured in modules according to two categories : the thematic modules, such as aquatic species, marine resources, fishing technology, general fishery issues, and the utility modules such as a references, statistical databases, maps, pictures or glossary.

FIGIS handles four main types of information :

- Statistical time series, queryable thanks to a powerful query panel engine, returning tables, customisable graphs, and later spatial representations
- Traditional data bases such as the Glossary, or the Vessel's registry
- Knowledge bases allowing to wrap together text, images, maps, and graphs reflecting the knowledge one has on a given information object of interest; this knowledge is presented as fact sheets which editors customize to their requirements
- Geographical information system, the georeferencing basis in FIGIS, allowing outputs in maps products.

The FIGIS Web interface is one of the FIGIS **information products**, characterised by the following features :

1) An easy way to access to information : despite containing complex information, the aim will be to make access as simple as possible for the user : the home page shows various entry points to the major information domains and utilities, each domain being further categorised according to the main data types. Wherever possible, vertical links allow to navigate across scales and aggregation levels.

2) Elaborated information : FIGIS presents knowledge in the form of synthetic notes, illustrated with supporting images and graphs. The fact sheet, a fundamental FIGIS concept, is the result of compilation, analysis and synthesis. Behind a fact sheet, there is editorial effort to disseminate relevant and accurate information on one topic. One important aspect is that the presentation template (style - look and feel) can be adapted to target different types of user.

3) Integrated information : the output for one given object is not limited to the input. Thanks to the integration ensured by the system, the output may include additional pieces of information elaborated by other FIGIS partners : a typical example is statistical graphs nested in fact sheets. Fact sheets also contain dynamically elaborated links based on the detection of related objects in the data base.

4) Quality controlled information : information objects are created in the system under the responsibility of the owner who is the FIGIS partner having an institutional mandate to document or report on these objects. Owners are responsible for the content and quality of the data they contribute. Each information domain enforces integrity rules that implement conceptual definitions, eg a stock is defined as a compulsory association between a water area component and a species component. These rules are used to define objects'identity, this identity being reflected in the fact sheet's header layout : the header's layout for a stock would feature the concerned species pictures side to side with a map localising the water area. . Information objects are structured in topics and sub-topics (according to partner's needs and agreements) resulting in a very systematic and comprehensive documentation. Processes for the elaboration and validation of information are documented.

5) A media adapted to each client : the Web interface is only one of the FIGIS information products. The FIGIS outputs can be generated under various forms, like paper publications (eg statistical yearbooks, or catalogues), customised CDRoms targeting specific audiences (eg the Fisheries Atlas).

2.2 The operation of FIGIS

FIGIS needs to handle sustainable information, and the best pledge for ensuring information sustainability is to get it produced under an institution’s mandate. This is why contributors to FIGIS are institutional partners (internal or external to FAO), who agree to share their information programs within FIGIS. Partners will contribute information according to Partnership agreements, specifying their roles, rights and obligations. They are responsible for the content and quality of the data they contribute.

Thus, FIGIS is going to rely upon partners mandates, with an objective to streamline flows of information from national, to regional then to global levels.

To achieve this, the technology utilises the World Wide Web to make FIGIS a distributed information system.

For effective, systematic exchange of fisheries information, FIGIS needs to promote and get agreements on standards for information exchange. In that respect, FIGIS is developing three main tools :

- A library of XML fisheries information topic descriptors, constituting the FIGIS Metadata : these Metadata terms introduce the FIGIS concepts, and explicitly show the data model and the information structure that they convey. They are proposed together with their semantic and syntax.
- A multilingual thesaurus with agreed vocabularies, relationships between terms, including standard classifications and coding systems : this shared thesaurus aims at ensuring integration across domains and interoperability between systems.
- A glossary, to manage terms definitions and to ensure terms are correctly understood

3. PROGRESS ACHIEVED AS OF JULY 2001

At its mid-life term, the project has progressed on 4 major fronts, and the main achievements are as follows :

Partnership : being a distributed information system, partnership is the key component of the FIGIS success. At the end of the Project, an effective and institutionalised partnership is expected with a core set of partners. The project (FIGIS development phase) serves the purpose of determining what the partnership agreement(s) should look like.
Progress :

- ✓ FIRMS : since July 2000, pre-partnership agreements have been signed with 6 Regional Fishery Body partners (SPC, ICCAT, ICES, NAFO, IOTC, GFCM) and positive feedback has been received for doing so with 2 additional ones (CECAF and IATTC). The first pre-agreement is being signed with Vietnam, and other statement of intentions have been received from countries like Australia, France, and Canada. An agreement with Fishbase has also been signed. To support further the full Implementation of this partnership, a FIRMS sub-project proposal has been formulated and unofficially presented to the EU donor who stated very positive its intention to support it.

- ✓ ASFA : a pre-agreement is also being discussed with ASFA

- ✓ FIGIS has also worked out arrangements with 2 Fisheries Department services (Inland Fishery Resources and Aquaculture and Fish Industry and Utilisation) to start extending FIGIS to the domains of inland fisheries, aquaculture and fish trade, marketing and utilization.

Dissemination system : the dissemination system is the general tool allowing FIGIS users to access to information.
Progress :

- ✓ the internet version 1.05 of the FIGIS Dissemination system has been released in June 2001. This release allows users to query and report on 5 FAO global statistical time series (production, aquaculture, capture, fleet and commodities), the FAO species identification sheets DB1 (including information on 300 species), the fishing technology DB (including information on 70 gear types, 50 vessel types and 10 Tuna fishing techniques), and the High Seas Vessels Authorisation Record DB (1242

[1] DB stands for Data Base

vessels with data from 4 countries : Canada, Japan, Norway, USA). This version also features a preliminary integration with the WAICENT KIMS GIS mapping systems.

- ✓ commitment is also made to add to this application a prototype of the Resources and Stocks module at the beginning of July. As part of this prototype, will be included the global Tuna Atlas statistical time series prepared in collaboration between FAO, IATTC, ICCAT, IOTC and SPC.
- ✓ off line, this dissemination system also includes the production of two statistical yearbooks, the FIDI Aquaculture and Capture Yearbooks of Statistics.

Working system : the working system is the general tool allowing FIGIS contributors to maintain their information. It is composed of a series of tools grouped in three main categories: 1) security - users management - access rights management; 2) Data Set management ; 3) Multi-lingual thesaurus in order to share common terms and coding systems for data exchange.

Progress :

- ✓ the Reference table management system is accessible on the internet for demonstration purpose, but its access is for the time being restricted to FIGIS potential partners. This application aims at disseminating Fisheries standard terms and classifications to allow data exchange. It will also be used for Reference table cross-referencing.
- ✓ a FIGIS XML2 data format exchange proposal (called FIGIS'ML) is under advanced elaboration : its conception results from the implementation of cases studies using the material supplied by a variety of potential partners to the FIRMS system, covering all FIRMS domains. Test of its usability by partners has been initiated, and a first training material version is available on CDRom.
- ✓ Phase 1 specifications for an online Web site Content Management System has also been completed, in close collaboration with WAICENT. These specifications provide for a distributed management of the overall content of a web site such as the Fisheries Department one, including News, Meeting documents and reports, Publications, and all subject Gateway pages, thus bringing under the FIGIS unbrella the whole Fisheries Department web site.

GIS : FIGIS being a GIS based information system, the Project aims at the development of a library of GIS layers, according to a set of standards shared across FAO and (where applicable) the UNGIWG[3].

- ✓ most of the GIS layers necessary for Global mapping of marine fisheries in FIGIS have been developed, at various scales; these include : bathymetry, coastline, regional fishery bodies conventions areas, maritime political boundaries (EEZs), statistical water areas, landing places, country borders and sub-national administrative boundaries. A set of about 300 species distribution area maps has also been elaborated.

4. PLANS FOR THE NEXT 12 MONTHS

The Project in year 3 will concentrate its efforts on the development of FIRMS, the development of facilities to update the FIDI statistical data sets, and integration with some of the satellite modules.

[2] Extended Mark-up Language
[3] United Nations Geographical Information Working Group

- ✓ With respect to FIRMS, the prototype of the Stocks and Fisheries modules presented during CWP 19 in Noumea. It is then expected to use this prototype to animate a FIRMS seminar that will bring together the key foreseen partners worldwide. The objective of these seminars will be to set the technical and organisational foundations for the full FIRMS deployment.

- ✓ The development of the software allowing for the distributed maintenance of the applications will be initiated, including security framework, user management, access rights management, online editing forms. The conduct of this activity will spread until the end of the Project's life span, and tightly involve partners.

- ✓ With respect to maintenance of the FIDI statistical time series and HSVAR, the tools necessary to integrate the world-wide collated data in the common system, and to ensure its quality assurance will be developed, in close collaboration with WAICENT and the STAT2000 initiative. The software framework that will allow distributed management of data will be also be tackled.

- ✓ In addition to these core modules, satellite modules such as the Glossary, the Photofile, the Maps library, and the Atlas of fisheries issues will also be developed. It is also expected to set up the requirements for an interaction between FIGIS and partner systems like ASFA, DIAS, SIPAM or AAPQUIS.

- ✓ With regard to GIS, the development of GIS base layers will be carried on for the species distribution (reaching 480 species), and new developments will concentrate on the base layers of interest to the inland fisheries and aquaculture and on completing different scales for the available layers. Automatic on-line generation of composite maps like the ones required for Stocks and Fisheries will be worked out in collaboration with WAICENT.

- ✓ FIGIS will also play a role in the promotion of XML standards for exchange of Fisheries information. In collaboration with WAICENT and ASFA, FIGIS will participate in the development of a multilingual Fisheries online thesaurus application.

5. SOME OUTLINES OF THE FIRMS PARTNERSHIP

By compiling a number of ideas that have been expressed on the subject of a FIRMS partnership, this chapter intends to trigger further discussion to progressively elaborate a text acceptable to all Partners which formally establishes the FIRMS Partnership.

5.1 The needs for a partnership

Needs expressed at Regional level :

- ➢ Gaining more strength, more visibility, through building community of responsible agencies sharing same philosophy of the need to report in an objective way an information backed with best scientific evidence

- Promoting (through reporting) a more responsible management of fisheries at national level

Needs expressed at National level (Vietnam) :
- building a commitment at national level that pulls-up efforts to develop national fishery statistics

5.2 Objectives of the partnership :

- Building community of responsible agencies willing to report in an objective way on Fisheries status and trends thus contributing to promoting responsible management of fisheries.
- Promote progressive extension of fisheries status and trends reporting to all marine fishery resources.
- Develop, share and maintain services for the collection, management and dissemination of information

5.3 Scope of the FIRMS partnership :

The foressen categories of partners are :
International FIRMS partners : IOTC - IATTC - ICCAT - ICES - NAFO - FAO - GFCM - SPC - ...
National FIRMS partners : national centers of excellence
Network partners : Fishbase - ASFA

The main information domains dealt with are : Species - Stocks - Fisheries - Fishery management systems - and to a certain extent Fishing technology - Vessels

5.4 The FIRMS Partnership Agreement :

The overall partnership agreement will make distinctions according to the main categories of partners.

Partners obligations : Partners obligations will be both defined in general terms and more precisely on a case by case basis through specific "bilateral" agreements.

International FIRMS partners will have general following general obligations :
- responsibility for reporting at global and regional level according to quality assurance rules
- providing necessary assistance in their area of competence to developing countries
- attending meeting of the board

National FIRMS partners will have following general obligations :
- responsibility for reporting at national level according to quality assurance rules
- attending meeting of the board

The content of the specific "bilateral" agreements will clearly define the nature of the information and the scope of the contributions, addressing :

- data type and standards
- data collection, authentication, processing and transmission
- confidentiality, dissemination and feedback

Models of "bilateral" specific agreements : provisions are made for various levels of commitments according to three options :

- Memorandum of understanding : firm understanding to supply information and process and disseminate it in a particular way (donor requirement, or transparency requirement)
- Exchange of intentions : slightly less formal approach; exchange of letters with expressed intents to do certain things, with list of details attached
- Advance notice of data accessibility : convenient and schedules institutional reminder that data may be made available in a certain time and in a certain way

Partners entitlements : entitlements are classified in Minimum entitlements and Additional entitlements

Minimum entitlements :

- ✓ full access to system's tools for dissemination of proprietary information
- ✓ privileged access to FIRMS non-public information (eg biological assessment parameters, methodologies, ...)
- ✓ privileged access to FIRMS services, like
  - facilitate the access to standard classifications
  - facilitates the access to standard GIS layers
  - training in tools and information standards
  - share software library

Additional entitlements may be agreed upon as part of "bilateral" specific agreements

The FIRMS board : It is a decision making and monitoring forum. This forum states on membership, partnership rules, information management rules, implementation of services. It is composed of one representative for each partner, and decisions are made wherever possible by consensus

The FIRMS Secretariat : FAO shall provide the secretariat. The functions of the secretariat are :

- ✓ to implement decisions of the board
- ✓ to represent the board on legal aspects
- ✓ to administer trust funds
- ✓ to oversee the implementation of services, including new software tools, information methodologies, training tools
- ✓ to provide a system of quality control
- ✓ to receive inputs from certain contributing developing country institutions
- ✓

6. OVERVIEW OF FIGIS DESIGN PATTERNS

6.1 FIGIS Concepts :

Information in FIGIS is organised according to the multiple views one can have of the Fisheries system. Each view corresponds to one disciplinary (specialised) approach of the system, hence represents the different roles and reporting responsibilities biologists, technologists, environmentalists, scientists, or managers may play. The view may lighten simple concepts, like aquatic species, or geartypes, or complex concepts built from relationships established between simple ones, like stocks, fishing techniques, fisheries or management systems. Below is proposed a list and short definition of FIGIS concepts typical of the FIRMS subsystem.

Aquatic species : Aquatic species are bio-taxon that have been defined by taxonomists. Groups of aquatic species may be of taxonomic, commercial, statistical, or 'common-sense'.

Area : Area identifies statistical, political, environmental or other geographically based boundaries using standard coding systems such as ISO. Wherever possible area identifiers have a GIS representation that allows data to be viewed as a polygon, line or point mapping object.

Stocks and *Fishery Resources* : Stocks are units generally defined by scientists for assessment purposes, and their indicators tend to describe their size, potential, health status and trends. Fishery Resource is being more used when one needs to reflect a notion of use or value of aquatic resources. The term "resources" is also often used when referring to vaguely defined "stocks."

- ✓ Fishery Resources and Stocks are identified in FIGIS as a combination of an *Aquatic species* (or *Species group*) and a *Water area* geographical location. This water area may be described at any scale using standard statistical areas, areas of competence (e.g. EEZs) or environmental geo-classification systems such as Large Marine Ecosystems.

Geartype : Geartype are categories of devices used in capturing aquatic species. Any new Geartype is identified by reference to standard international types.

Vesseltype : Vesseltypes are categories of floating vehicles (or platforms) used to carry Geartype and capture fish. Any new Vesseltype is by reference to standard international types.

Fishing techniques : a fishing technique describes the set of equipment used for the capture of a target species together with any associated fishing practices.

- ✓ Fishing techniques are identified in FIGIS as the combination of a *target Species* (or *Species Group*) and the *Geartype* + *VesselType* pair used to catch it.

Fishery : a Capture fishery is an activity leading to harvesting of fish (sensu lato) from the wild using some fishing technology.

- ✓ In FIGIS, it is proposed to define and characterise a fishery along three primary dimensions (or keys) resulting in a flexible nested structure of fisheries types according to various scales and aggregation levels. As an example, the western central-Pacific Japanese purse-seiner tuna fishery is identified in the following manner:
  - The target *Species*, or target *Group of species*, e.g. tuna.
  - The *Water area* geographical location of the fisheries (e.g. the western central-Pacific) associated with a unique geographical identifier.
  - The *exploitation unit*[4] (e.g. Japanese purse-seiner) may refer to any of the fisheries exploitation patterns: the *Geartype* (e.g. trawl), the *Vesseltype* (e.g. trawler), the *Fishing technique* (e.g. drum seining), or the on-board *Handling mode* (freezer-trawler), and/or any of the other aforementioned qualifiers, such as the *Form of exploitation* (e.g. subsistence, artisanal, industrial, commercial, recreational) or the *VesselFlag*.

Management systems and *Fishery management unit* : Decision-makers manage fisheries by identifying management units which they organise within management systems, themselves defined to reflect sector's strategies and objectives. Therefore, a management system is identified in FIGIS by:

- ✓ a *legal framework* (e.g. a law, set of decrees, management plan, 5 years development plan)

established within the mandate of

- ✓ a *Management Authority* (e.g. a regional body, a state, or provincial government)

and specifies management objectives, strategies or methods for at least

- ✓ at least one *fishery Management Unit*; these may be organised around fisheries biological, geographic, economic, technical, social or ecological dimensions. They are the focus for the application of the selected management methods and measures

Institutions : FIGIS Institutions objects are formal organisations (e.g. FAO) and/or their sub-divisions, departments, dependent bodies or institutionalised programmes, all with a legal status.

Programme and *Data set* : a Data Set is a computerised collection of information managed in an homogeneous way, usually under an institutionalised Programme. A data set is a domain used for managing ownership and user access, and giving information of quality assurance type (data types, scope and coverage, processing methods, ...)

6.2 FIGIS architectural features

The FIGIS architecture is designed for a web-based distributed information system.

The three tier architecture which clearly splits up the overall system into a Data layer, a business logic layer (the Java engine), and a presentation layer (managing the final display on the user's client) allows easy reusability and maintenance, portability (platform independence) and scalability (modularity making it possible to use independantly sub-components of the system).

In a way, these qualities already provide for allowing the distribution of the system on partner's platforms. But more importantly, it is the use made of XML, the Extensible Markup

[4] the term "fishing unit" may be preferred

Language, to convey data between FIGIS system's layers, that makes realistic the concept of the distributed information system. XML has many advantages, being :

- a universal language increasingly recognised by the software industry as the universal language to convey knowledge between systems, providing for descriptors of the information structure
- primarily a text format
- a way to make possible communication of structured information between humans and systems
- a flexible solution that allows, thanks to the associated XSL, multiple types of outputs, including html, pdf, text, xml.

At present, FIGIS data input is achieved loading XML documents created by editors working on their desktop at FAO headquarters, and FIGIS output (on user request) is primarily the same XML before its conversion in a browser compatible format. This input XML may have been as well produced by an external system, or by a human editor sitting in a partner agency. And FIGIS output can be sent to the partner in XML form. This means that any system or human sending (or uploading using the internet) an XML file according to agreed standards may interact with FIGIS.

The implementation of a distributed information system thus depends on agreeing information standards, mainly at two levels :
- Meta data descriptors, as proposed in the FIGIS'ML design patterns : at this level resides the potential to exchange information developed under the same semantic, and to give unambiguous behaviour instructions to the system ;
- Standard multilingual thesaurus of terms and international classification and coding systems: at this level resides the potential for integration of information within and between disciplines.

6.3 Requirements implemented within the FIGIS'ML DTD

The following list of requirements have been collected through discussions held in the context of the ACFR/fishery status and trends meetings, and the elaboration of pre-agreements with FIRMS potential partners.

Management of FIGIS Objects : patterns for the creation and validation of new objects in the FIGIS system, or the referenciation to exiting objects, have been brought particular attention. Effectively, FIGIS is a system where the generation of new objects is likely to increase exponentially if uncontrolled, hence overall system quality requires strict rules.

Ownership : each FIGIS validated object is assigned an owner, having the intellectual property, responsible for the creation and maintenance of this object. Ownership identifies primarily the institutional Programme under which the object is created and maintained, different organisations/institutions being possibly collaborating in that programme. Identifying institutionalised programmes serves a threefold purpose : ensuring a sustainable reporting on the information objects and linking it to Programme's information management and quality assurance documentation.

Quality assurance : as said above, full quality assurance documentation is accessible under the Programme header. Proposed details for full quality assurance documentation are

presented in document CWP/15/FAO, Agenda Item 15. In addition to the knowledge about the Programme responsible for the information object, the minimum level of quality assurance imposed at that stage is the full bibliographical record from which is extracted the information object or one of its attributes, and the creator of the XML document / submiter of data.

Tracking original sources down the aggregation levels : the various FIRMS partners have reporting responsibilities at different scales. Typical examples are ICES reporting at both individual stock (eg Cod in Sub-division 22-25) and sub-regional resource level (eg Cod in Baltic), and FAO at Regional level (Cod in area 27) with references made at sub-regional level (Cod in Baltic). This situation generates potential redundancy and possible contradiction. Thus, the system allows to link information objects down the aggregation levels, either by allowing the editor to enforce the existing relationships, or by letting him nesting some (more or less) standard keywords for the system to look at proxi objects. In the short term, the objects having a mixed reporting (like in the example above "Cod in the Baltic") may appear with observations issued by different Programmes (here FAO Regional review and ICES ACFM). The FIRMS partnership may in the medium term result in an agreement to avoid this duplication.

"Versioning" and "Observations" management : updates made to the information related to any given object either correspond to various versions of the same observation, or to various observations (possibly reflecting real change) occuring over time.
Versioning allows management of files documenting a given object from the same bibliographical source, and loaded successively into the system. Uploaded version is stored as unvalidated and only user with correct access rights may view it. As long as unvalidated, newer versions may be uploaded that will delete former ones. Validation means making the version accessible to a broader range of users, according to permissions assigned at Programme level. Still, new versions can be uploaded in the temporary area, that would once validated overwrite the "public" version.
"Observations" management allows management of files documenting a given object from distinct bibliographical sources, ie observations made on the same object along time, or observations issued from different owners (Institutional Programmes). The object's owner (the owner declared for the object when originally created) has rights to manage the observations made on that object : he decides which is the master observation (by default his most recent one) and wether or not to give "public" access to other observations from the master one. Observations being able to convey both short-living information (status and trend, current management, assessment, exploitation), and long-living one reflecting accumulation of scientific knowledge on fish populations, provisions have been made to differentiate these types of information.

XML model respecting both 1) a standard logical information structure and 2) partners original document published textflows : the FIGIS'ML design patterns demonstrates great flexibility, having been applied accross 7 domains of information (Species, Geartypes, Vesseltypes, Fishing techniques, Stocks and Resources, Fisheries, Fishery management systems), and for the Stocks and Resources domain to 20 case studies issued from 6 Programmes (3 from FAO regional review, 4 from ICES, 3 from ICCAT, 2 from NAFO, 4 from SPC, 4 from GFCM). One major requirement made by potential FIRMS partners has been to respect the original document textflow, in order to maintain the overall consistency of the report reflecting in many cases a subtle consensus reached by the responsible committees. This requirement has been respected, and the editor can apply the XML structure such that

both original text flow and book structure are reflected, and the standard logical information structure (Cf annex) is enshrined in the document[5]. Thus, two views can be presented on the Web to the user : the whole original document, accessible through table of content sections, nesting links to other related objects, and the fact sheet corresponding to any individual object created, making use of the standard logical information structure to present it according to any layout requirement (one single layout is yet proposed as part of the prototype).

Navigation across related system's information objects : FIGIS'ML design makes provisions for navigation to other objects (of same or different domain) known by the system. Various options are offered to the editor : light approaches consist in tagging keywords found in the text and let the engine make the best retrieval of targets. Heavier linking instruction patterns using unique identifiers (when known) or standard terms/codes allow more accurate linking.

Privileged highlights : using the highlight tags, editors may identify essential sentences within paragraphs dealing with given topics. In the absence of well established standard, the highlights may serve various needs, like indexing orientation in order to facilitate search, or more simply layout.

Time series indicators management : provisions[6] are made for the capture and management of time series of indicators, be they exploitation (catch, landings, effort, size of fish caught, ...) or assessment (SSB, Fishing mortality, abundance indexes, ...) indicators.

Images and dynamic graphs generation : design allows for capture of images and automatic assignment of keywords reflecting the image nesting context. Other provisions are made to allow the editor to specify prefixed parameters for a dynamic query to target data base and resulting in graphs or table generation within the fact sheet.

Human readability : serving both the purpose of system-to-system, and human to system interaction, the XML language and associated design patterns must be human-readable. A balance has been struck between generic and human-readable elements.

7. ACTION BY THE MEETING

The meeting is invited to review report on the development of FIGIS so far and to advise on the proposals for future developments of FIGIS and its management through a proposed FIRMS Partnership Agreement.

[5] Q : mechanism to validate the structure, to validate Metadata terms definition thus usage
International classifications and standard thesaurii terms referred to
Q : mechanisms to agree on these terms, their definition(s), their classification
Which integrity rules for the management of new concepts like stocks, fisheries, ...
Q : validation of integrity rules, guidelines for creation of coding standards

[6] provision means DTD structure has been proposed for it , but no actual use is made of it at present