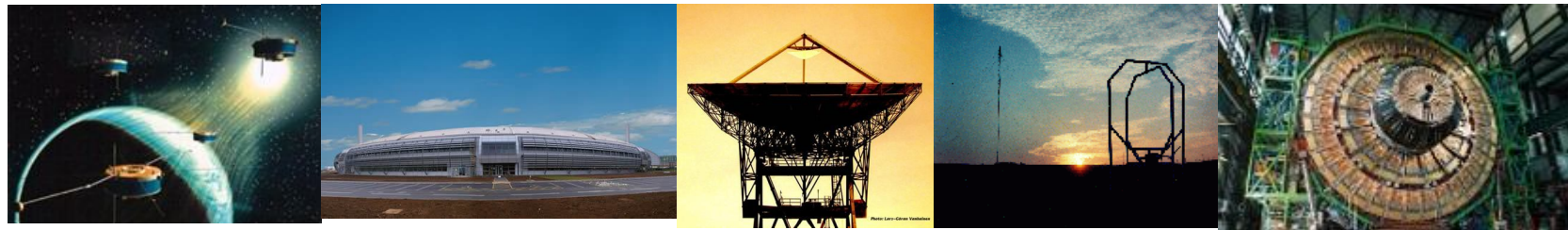
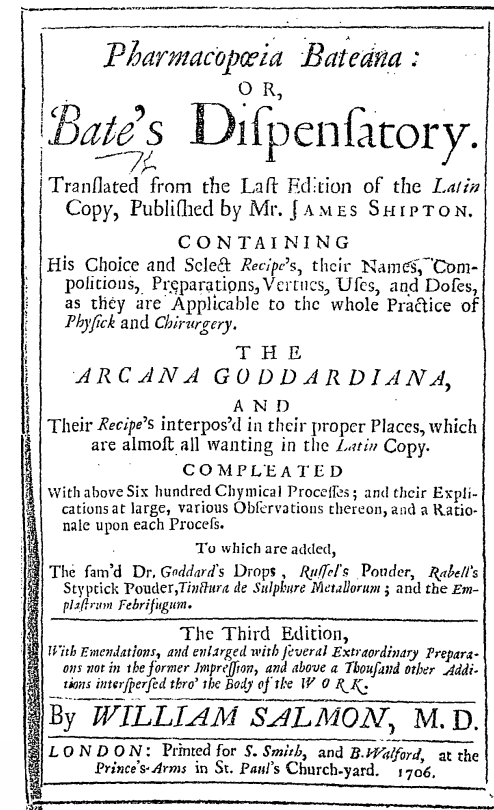
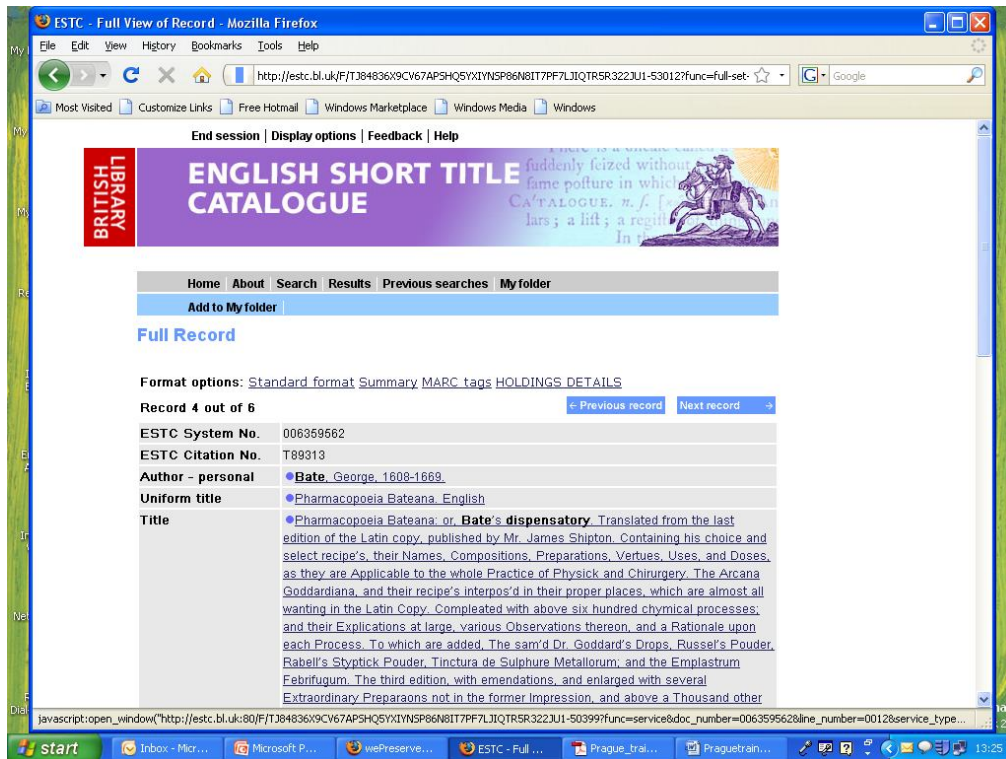


OAIS based information flows



Preservation analysis approached from the information perspective

So just what is preservation ?



§ 2. And if at last to this Tincture thirty drops of the Oyl of Wormwood be added, it will yet be so much the better.

§ 3. It is a great Stomachick, strengthening and fortifying of those parts to a wonder.

§ 4. It causes a good Appetite of Food, and by cherishing and exciting the languid Heat of the Part, causes a good digestion; by which means good Blood is generated, and a good Habit of Body created.

§ 5. It both preserves from, and cures the Scurvy in a cold Habit of Body, and is an excellent thing for such as are inclinable to the Jaundice and Droppie.

§ 6. Being constantly taken for some time, after due purging, it opens Obstructions of the Liver, Spleen, and Womb, and provokes the Terms in Women. Dose a gut. x. ad xx. in Wine or Ale, or some appropriate Vehicle.

II. * *Tinctura Amygdaloides*, The Almond-like Tincture.

Bate.] *R* The white parts of Benjamin, Syrax, Calamita, *A.* ℥j. Tartarised S. V. ℔j. digest till they are dissolved, then filter and abstract the Spirit to the one half. It is an excellent Pectoral and Neurotick, good against Catarrhs, Asthma's Diseases of the Nerves, and provokes Sweat, &c. Dose a ℥ij. ad ℥vj.

Salmon.] § 1. In my Opinion, it will be best to preserve the Tincture with the whole quantity of Spirit, for it is little enough; lest by that abstraction the dissolved Gums should in part precipitate, or fall down to the bottom.

§ 2. And you will find the Tincture strong enough, so that at the utmost Dose, you need not give above ℥iv. or half an Ounce thereof.

§ 3. It must always be given in some proper Vehicle, for by reason of its great strength it is impossible to be taken alone.

§ 4. Being mixed with Wine, or any other Aqueous Vehicle, it makes it immediately look White like Milk, or an Emulsion of Almonds, from which it may take its Name, as well as from the Almond-like pieces of the Benjamin, of which it is in part made.

§ 5. *Le Mort* makes it of Flowers of Benjamin thus: *R* Flowers of Benjamin ℥j. rectified S. V. twice distilled from Carminatives ℥iv. mix and digest with a gentle heat, in a Vial with a long Neck, or Bolt-head, till the Spirit is tinged of a deep yellow colour.

§ 6. This, says he, contains much greater Virtues than the simple Flowers of Benjamin. It dissolves Wind, cures an inveterate Asthma and Cough, and helps the shortness of Breath, and difficulty of Breathing, as also gives present ease in the Colick. Dose a gut. vj. ad xx. or xxiv.

§ 7. Or thus, from the same *Le Mort*: *R* Tartarised S. V. ℥ij. or iv. Benjamin in fine Powder ℥j. Oyl of Rhodium gut. vj. digest till the Spirit is tinged of a rubicund colour.

§ 8. Take of this some drops, and mix it with an Ounce of Damask Rose-water, and it will become like Milk.

§ 9. It helps Spots and Pimples in the Face, Redness of the Eyes, and is good against all sorts of Inflammations.

§ 10. Inwardly you may give it mixt with Syrup of Hyssop, Liquorice, or Colts-foot, and exhibit it to such as are Asthmatick.

§ 11. He prepares it also thus; *R* Tartarised S. V. ℥ij. Flowers of Benjamin

Benjamin ℥ij. Syrax, Calamita, ℥ss. Oyl of Rhodium, gut. vj. Musk gr. iij. Croet gr. ij. mix and digest, till the Tincture is of a rubicund colour, then decant the clear from the feces.

§ 12. Of this he makes a *Lac Virginal* thus: *R* Of this Tincture ℥j. Water of white Lilies, or white Roses, or of Damask Roses ℥ij. mix them.

§ 13. It cures Inflammations of the Eyes, and an Erysipelas, &c. It is a most precious thing even for the most noble and delicate sort of People.

§ 14. It is also thus made: *R* Flowers of Benjamin ℥j. Syrax Calamita ℥ss. Oyl of Rhodium, or of Jessamy, gut. viij. Croet gr. viij. mix the Croet and Syrax together, then add the Oyl of Rhodium, and after that the Flowers of Benjamin, to which assise the S. V. and digest two or three days, then decant the clear from the feces.

§ 15. This last Preparation is an excellent Perfume, for Gloves, Cloaths, Linnen, &c. in this manner: *R* Damask Rose-water, or other perfumed Water ℥j. of this Tincture forty drops, in which let them be dip't or besmeared, and then gently dried in the shade.

§ 16. It is also accounted an excellent Cosmetick, washing the skin therewith; and allays Inflammations, more especially if a little Camphir be added to the Tincture.

§ 17. This of our Author's Prescription (as well as all the Preparations following it) is an admirable Pectoral, and Antiasthmatick, helping such as are troubled with difficulty of Breathing, or shortness of Breath.

§ 18. It is Cordial, moves, Sweat, and by reason of its fragrant Odour wonderfully com-

forts the Animal Spirits, suppresses noxious Vapors, and retells the malignity of Contagious Fevers. Dose a gut. x. ad xxx. in any proper Vehicle.

§ 19. *Locum Ambræ-griffæ*, oblinere potest, si loco Spiritus Vini ℥ Olei Ligni Rhodii, substituantur Spiritus Rosarum Damascenarum fragrantissimus & Oleum Cinnamonum eadem proportione.

III. * *Tinctura Antimonii Emetica*, Vomiting Tincture of Antimony.

Bate.] It is extracted of the Glass of Antimony with Spirit of Vinegar, then filtering and exhaling to dryness, the Matter dissolved in Water, filtered, and again abstracted to dryness, digest with [Tartarised] S. V. till it is of a rubicund colour, which filter. A Tincture may also be extracted from the Scoria of the Republic of Antimony, with Tartarised S. V. digested and filtered. Or, you may extract a Tincture from the Vitrum Antimonii, with rectified Spirit of Venus, which being decanted, may be abstracted in an Alembick, but not to dryness; then extract the Tincture therefrom with rectified S. V. which filter, and exhale to a convenient thickness. Dose to gr. x.

Salmon.] § 1. These Preparations are in general Terms; but because the Medicine is admirable beyond many others of much greater Names and Account, and because by these general Prescriptions, for want of Proportions, the young Tyro may easily err in the Process, we shall take the pains to explicate every thing more particularly.

§ 2. Maets makes it thus: *R* Alcohol of Vitrum Antimonii. q. v. assise thereon rectified Spirit of Venus drawn

The Ufual

Chymical CHARACTERS.

♄. Saturn, or Lead.	⊖. Salt Common.
♃. Jupiter, or Tin.	⊕. Nitre, Salt-Petre.
♂. Mars, or Iron.	♁. Antimony.
☉. Sol, or Gold.	⊙. Oil, of any kind.
♀. Venus, or Copper.	☉. Caput Mortuum.
♁. Mercury, or Quick-silver.	⊙. Alum.
♁. Luna, or Silver.	♁. Sal Gem.
♁. Bezoar minerale.	♁. Cancer or Crab.
♁. Arsenick.	♁. Sublimate.
♁. Day.	♁. Precipitate.
♁. Night.	♁. Water.
♁. Sal Armoniack.	♁. Tartar.
♁. Urine.	♁. Sulphur.
♁. Fire.	♁. Retort.
♁. Verdigrise.	♁. Vinegar.
♁. Cinnabar.	♁. Spirit of Vinegar.
♁. Chalcantum.	♁. Quicklime.
♁. Vitriol.	♁. Auripigment.

The Ufual

Medicinal CHARACTERS.

℔. A Pound, or ℥xii.	A F. Idem.
ʒ. An Ounce, or ℥viii.	A R. Aqua Regia.
ʒ. A Dram, or ℥ij.	℞. Idem.
ʒ. A Scruple, or gr. xx.	A V. Aqua Vitæ.
gr. A Grain.	B M. Balneo Maria.
gt. A Drop.	B V. Balneo Vaporis.
gut. Idem.	D. Distil, or Distilling.
M. A Handful.	Æ. Ashes.
P. A Pegil.	M B. Balneo Maria.
p. ij. One, two parts.	q. f. quantum satis.
ʒs. ss. half any quantity.	q. v. quantum vis.
N ^o . In number.	℞. Recipe, Take.
ā. Each a like quantity.	S. Spirit.
Ana. Idem.	S V. Spirit of Wine.
A. Alembick.	S A. Secundum Artem.
℞. Bole Armeniæ, fine Bole.	S S S. Stratum super Stratum:
aaa. Amalgama.	Or, Lay upon Lay.
℞. Aqua Fortis.	V. Vinum, Wine.

PHAR

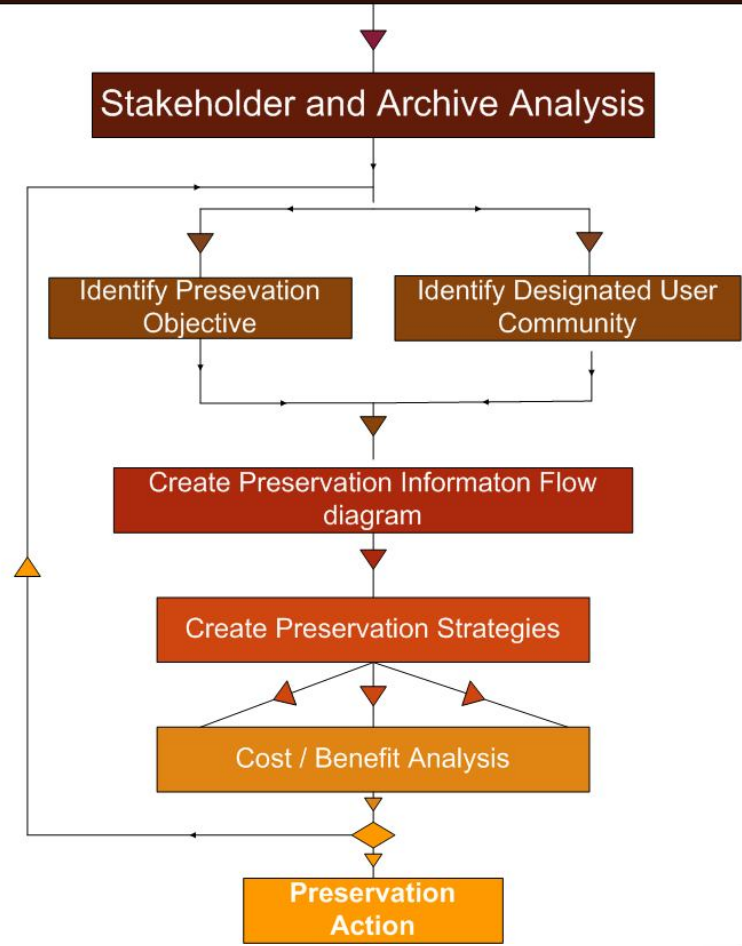
So how do I go about preserving the scientific content ?

- What provenance and context information might you want to provide?
- After reading the recipe what extra semantic information would be required?
- What other representation information might you wish to include?
- What sort preservation risks might be associated with the above information?
- What strategies could be developed to deal with this?
- What are the preservation risks associated with the Adobe9 reader?
- What strategies could be developed to deal with this and which do you think would be most suitable?
- What other preservation objectives might be set?
- What would the consequences be?
- What else should be clarified about the designated community?

*Civet gr. ij. mix and digest, till the
Tincture is of a rubicund colour, then
decant the clear from the feccs.*

*lamina ℥iſ. Oyl of Rhodium, or of
Feffamy, gut. viij. Civet gr. viij.
mix the Civet and Styrax together,
then add the Oyl of Rhodium, and
after that the Flowers of Benjamin,*

Preliminary investigation of data holdings



**CASPAR
Preservation Analysis
Workflow**

CASPAR Questionnaire

The CASPAR questionnaire contains key questions which allow you to carry out a preliminary investigation into an archive data holdings. The CASPAR questionnaire is strongly guided by OAIS and the CASPAR architecture. It lays out 13 key questions which critically allow you to.

- Understand the information extracted by users from data
- Identify Preservation Description and Representation information
- Develop a clearer understanding of the data and what is necessary for its effective re-use
- Understand relationships between the data files and what constitutes a digital object within the archive

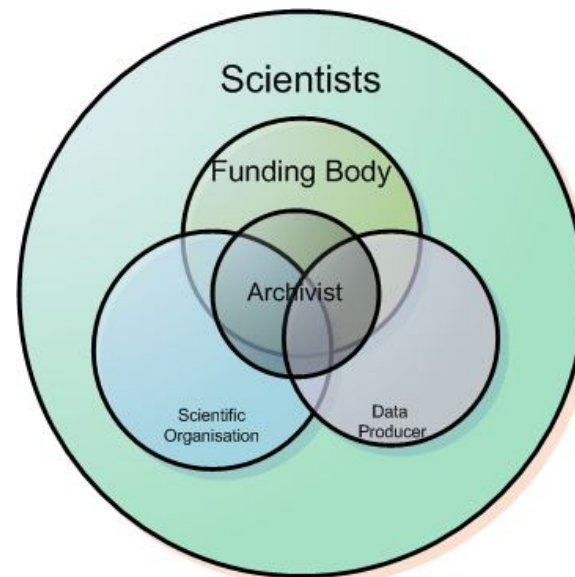
Stakeholder Analysis

After carrying out the questionnaire process for each of archive it became necessary to carry out a stakeholder analysis for these archives. This is due to

- Stakeholders having differing views of the knowledge a data set was capable of providing an end user
- Stakeholders identifying different end users who possess varying skill sets and knowledge base
- Stakeholders producing or being custodians of different information vital for re-use of data

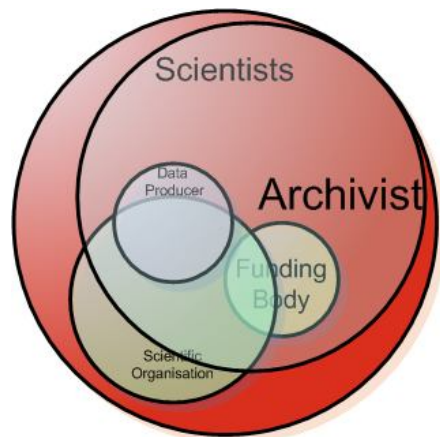
Archive Evolution and Management

In addition to familiarizing oneself with the stakeholders from the different categories it was additionally beneficial to understand how an archive has evolved and been managed. This can be used to illuminate the different uses of data over time and the production of associated representation information vital for that type of use

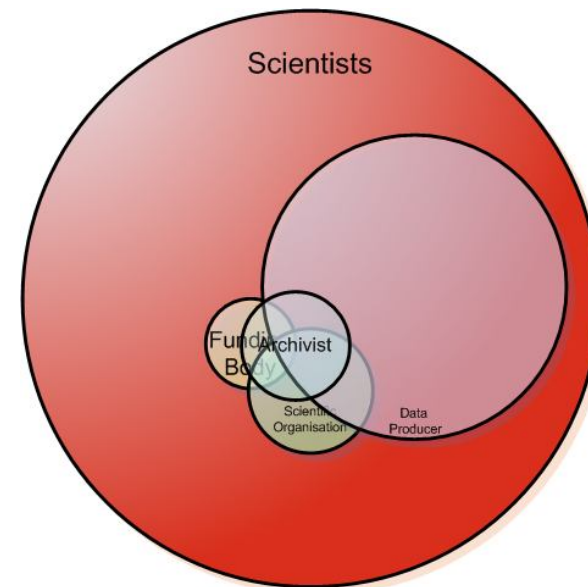


The diagram below is a graphical representation of the awareness the different stakeholders have of data use by scientists and their relationships to each other.

A tale of two archives



MST Data Archive



Ionsonde data

Factors which influenced the use and re-use of data over time

- Birth and development of a science
- Events which influence data use such as the second world war or global warming
- Development of countries technologies and the emergence of global networks
- Publication of journals technical manuals, interpretative handbooks, conference proceeding, minutes of user group meetings, software etc.
- Emergence of branches of science and associated organisations
- Stewardship of data and the influence of different custodians

This is not an exhaustive list as many factors influencing data re-use are domain specific as is the categorization of the stakeholders. The generic principal of carrying out stakeholder characterization and the identification of factors will be domain independent.

The Designated User Community

The definition of the skill set is vital as it determines the limit to the amount of information which must be contained within AIP in order to satisfy a preservation objective. In order to do this the definition of the designated community must be

- Clear with sufficient detail to permit meaningful decisions to be made regarding information requirements for effective re-use of the data.
- Realistic and stable in so far as there is reasonable confidence in the persistence of the knowledge base and skill set.

Typical examples from atmospheric science

- Ability of a community to successfully operate software i.e. knowledge of correct syntax to input commands into a UNIX command line.
- Ability to utilise correct analysis techniques with data to remove background noise or identify specific phenomena
- Comprehension of community vocabularies
- Appreciation of different scientific techniques employed during the production of data, their limitations and comparative success rates for picking up desired phenomena.
- Knowledge of atmospheric events or processes which may be affecting the atmospheric state being measured within a data set.
- It is the appraisal of this knowledge skills base as permanent attribute of the designated user community which will determine whether it is necessary to preserve this information by including it within an AIP (Archival Information Package).

MST Designated user community

The designated user community which the archive wishes to serve is that of the UK atmospheric science research community. It believes the community will still

- Possess the basic knowledge of a UK physics graduate
- be able to read English
- be numerate and able to acquire necessary skill to meaningfully manipulate analyse and create models for data
- have sufficient technical skills within the community to write programs or scripts to extract parameters from data files given adequate structural description
- be able to comprehend current journal literature on atmospheric science

Defining a preservation objective

The analysis carried out before this point may present you with a natural easily defined preservation objective or alternatively there may be a greater number of options which overlap and are more difficult to define. It is important to note that this type of analysis cannot advise you as to which preservation option to choose but merely clarifies the options available to you.

Preservation objectives should be

- Specific well defined and clear to anyone with a basic knowledge of the domain
- Actionable the objective should be currently achievable. It is important to note the information ultimately to be extracted by a user should be established and not an attempt to “predict the future”
- Measureable it is critical to know when the objective has been attained in order to assess if any preservation strategy developed is adequate.

MST Preservation Objective 1

A user from a future designated user community should be able to extract the following information from the data for a given altitude and time

Horizontal wind speed and direction

Wind sheer

Signal Velocity

Signal Power

Aspect

Correlated Spectral Width

MST Preservation Objective 2

A user from a future designated user community should be able to extract the following information from the data for a given altitude and time

Horizontal wind speed and direction

Wind sheer

Signal Velocity

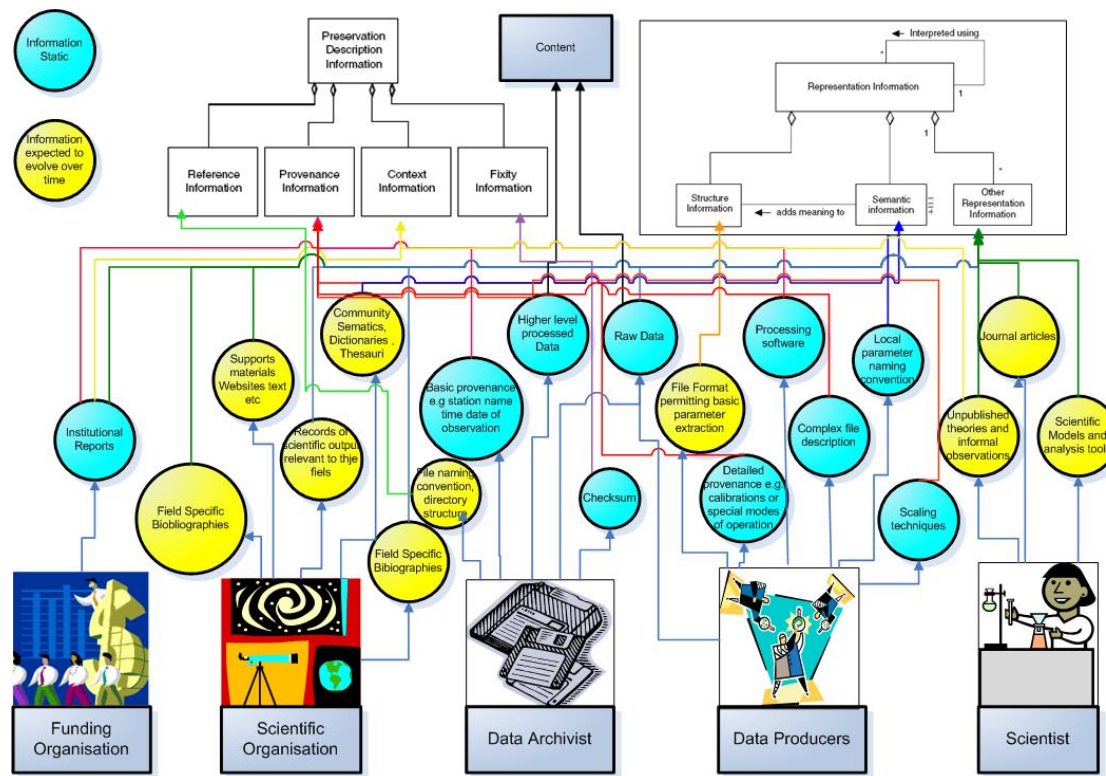
Signal Power

Aspect

Correlated Spectral Width

In addition future users should be able to identify common atmospheric phenomena which have been previously established by MST data users and noted in peer reviewed literature or the MST conference proceedings.

Create Preservation Information Flow



OAIS preservation information flow diagram

An OAIS preservation information flow diagram is graphical representation and analysis tool which is a hybrid of information flow diagram (need to sort out reference) and the OAIS reference model.

Elements of OAIS Preservation information flow diagrams

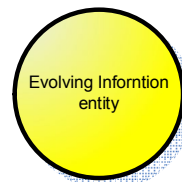
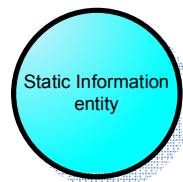
Standard OAIS reference model components of an AIP: These are the standard components of an AIP. All information entities must be mapped to at least one of the following component within an AIP.

- Content
- Representation Information
 - Structure
 - Semantic
 - Other
- Preservation Description Information
 - Reference
 - Fixity
 - Context
 - Provenance

Information Objects

An information object is a physical unit of information suitable for deposit within an AIP as it currently exists. An information object must have the following attributes

- Name
- Description of information contained by entity which is vital for the preservation objective e.g. a piece of software contains structural information and algorithms for the processing of data within it's code
- Description of format i.e. website, PDF, database or software
- Assessment of preservation risks and dependencies



Stakeholder entities

A stakeholder entity is the named custodian of the required Information entity

Notation used



Supply Relationship

The supply mechanism should simply be an indicator of any impediment to the current supply of an information entity such as an embargo or assertion of copyright. The attributes of a the supply relationship are

- Supply possible (Yes/No)
- Description of supply impediment

Notation used

Supply possible:

Yes 

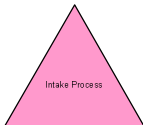
No 

Supply Process

The supply process is any process carried out on information supplied by the stakeholder in order to produce the information object. Its attributes are

- Name
- Description of process e.g. dump of a database table into a csv file, archiving of public website or reformatting of data files









Notation used



Packaging relationship

The only required attribute of the packaging relationship is that it links an Information entity to at least one standard OAIS reference model component of an AIP. However many implementations of packaging such as XFDU require additional information.

Notation used

	Reference information
	Provenance information
	Context information
	Fixity information
	Structure information
	Semantic information
	Other information
	Content

Information object dependency relationships

The information object dependency relationship connects two information objects. If preservation action is carried out on one object it may impact on another object with a dependency. For example if a piece of software is identified to be at preservation risk and deconstructed to a structural format and analysis algorithm descriptions, the software user manual will be flagged up by the dependency relationship and may be removed on the basis that this information is now irrelevant.

Notation used

.....

Preservation strategies - In response to a supply impediment

Where there is an impediment to the supply. A strategy must be developed in order to either overcome the impediment immediately for example purchasing a special licence for software or an institution could develop a simplified open source version of the software which contains the key functionality. The alternative is to develop a mechanism that effectively references the external information object in tandem with a mechanism for monitoring the situation (preservation orchestration).

Preservation strategies - In response to an identified information preservation risk

Information objects must be inspected on a case by case for their individual preservation risk based on dependencies which will be affected by the passage of time. Different strategies which effectively obviate these risks must then be developed.

Preservation strategies - As a secondary response to a preservation strategy

Where a dependency between information objects have been identified secondary preservation strategies may need to be developed for a related objects.

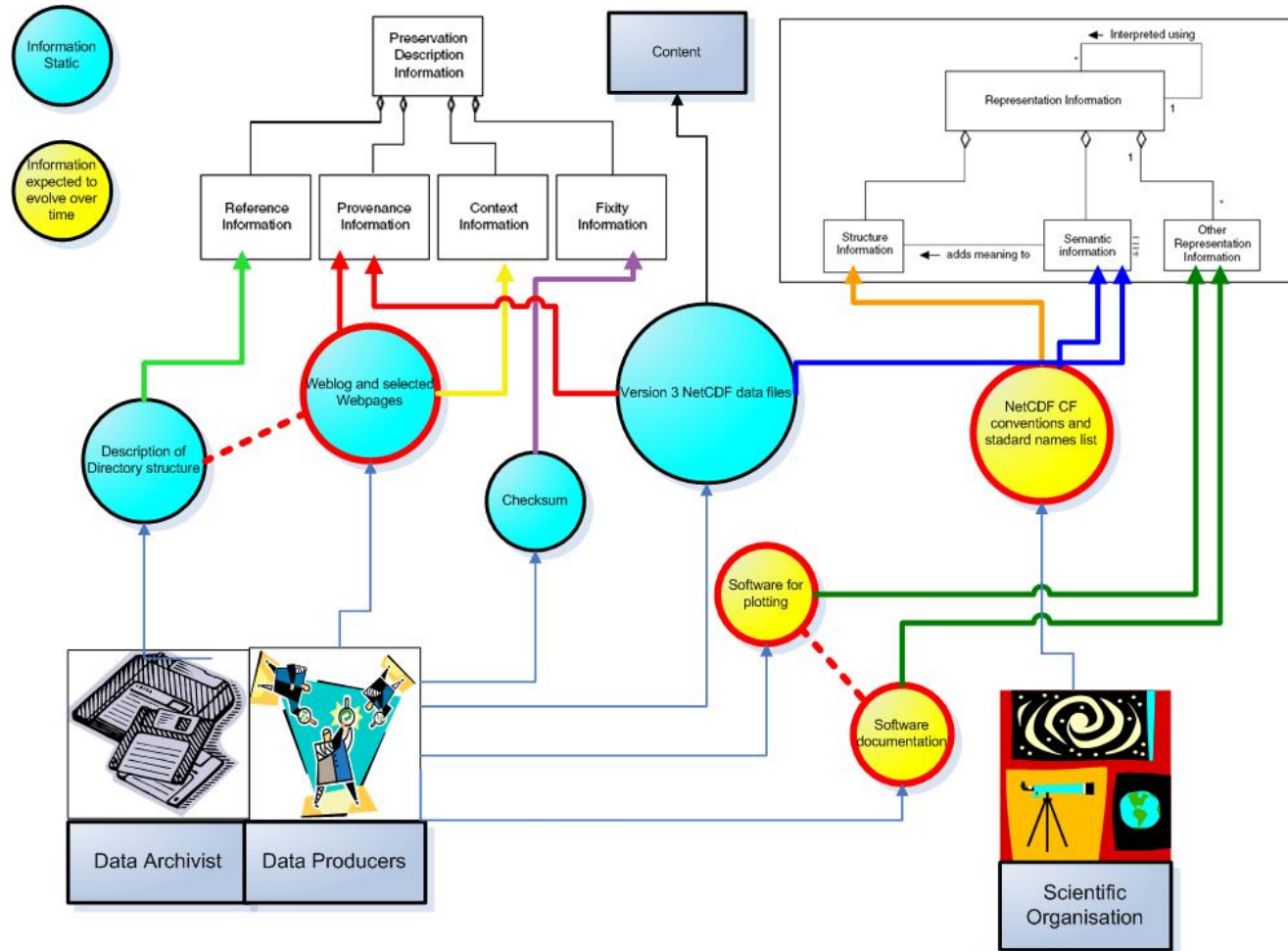
The Plan

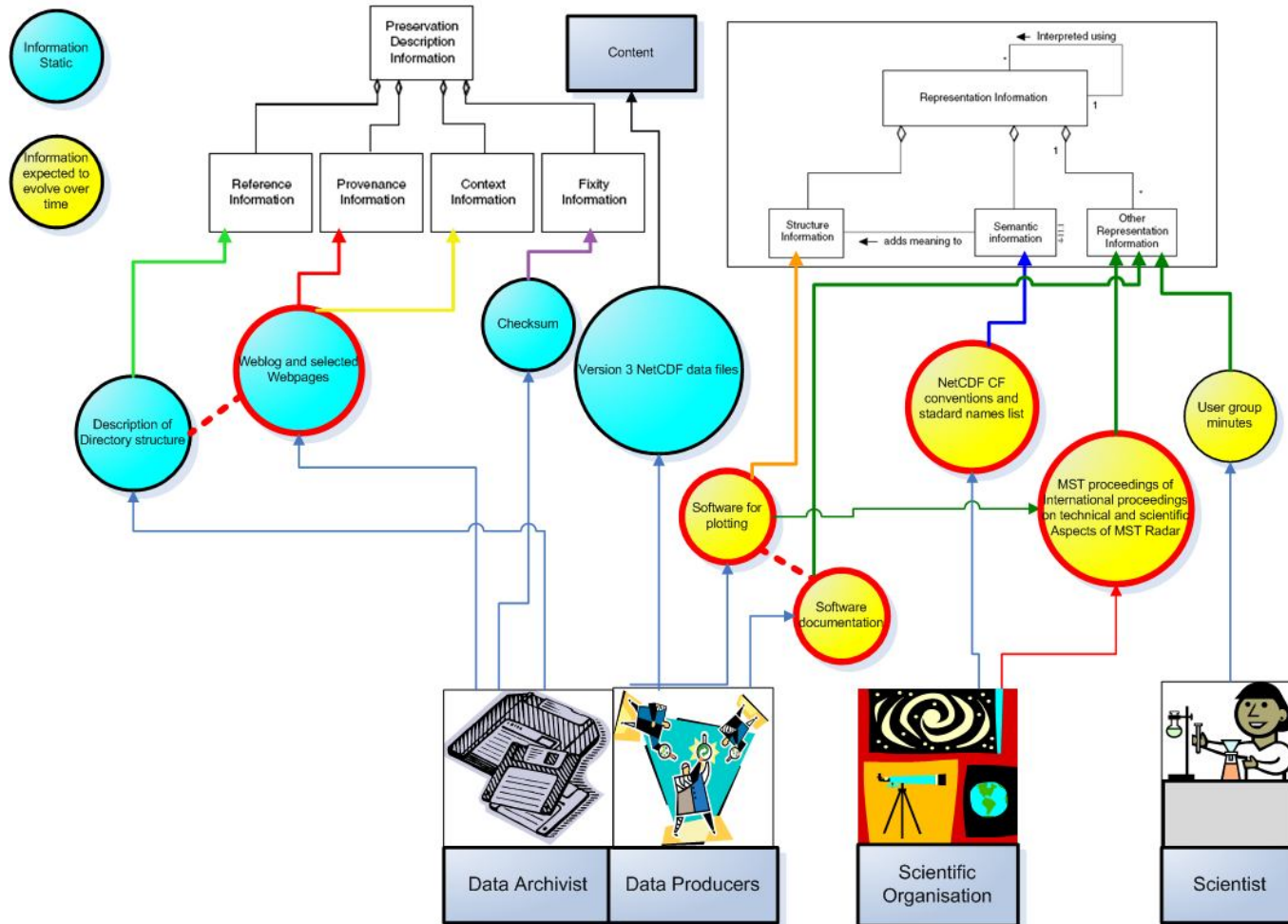
Multiple strategies can be developed for each instance in these areas. This results in a number of preservation plans being formed.

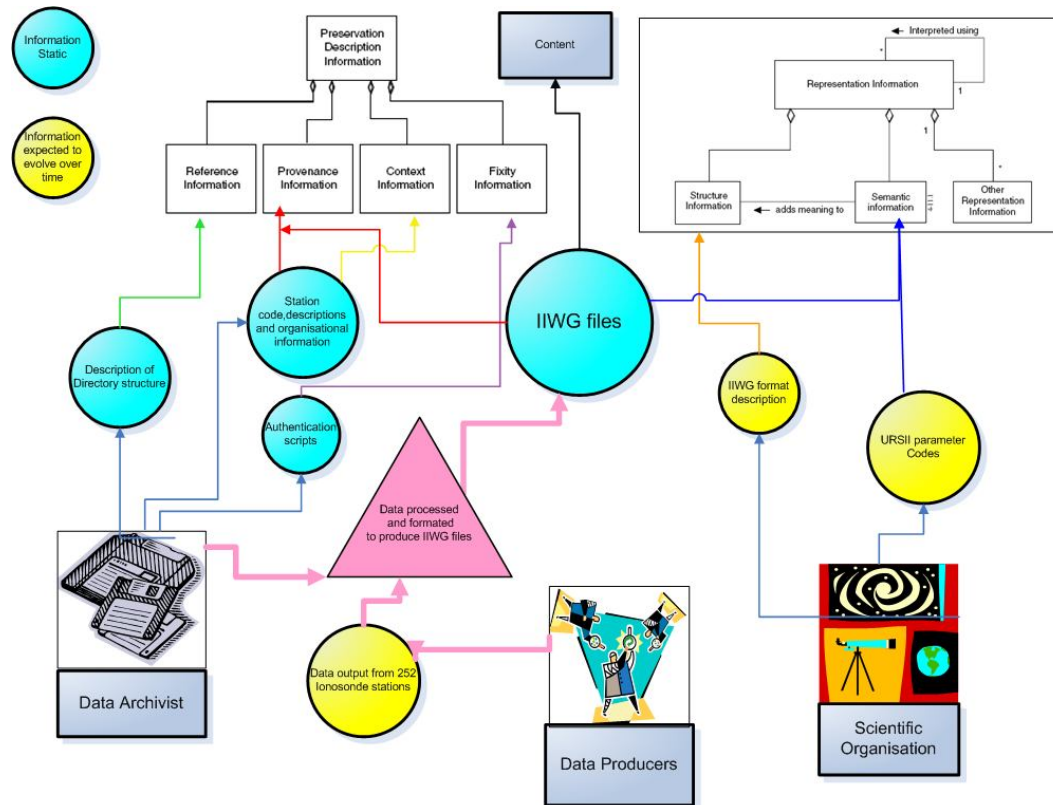
A preservation plan consists of a unique

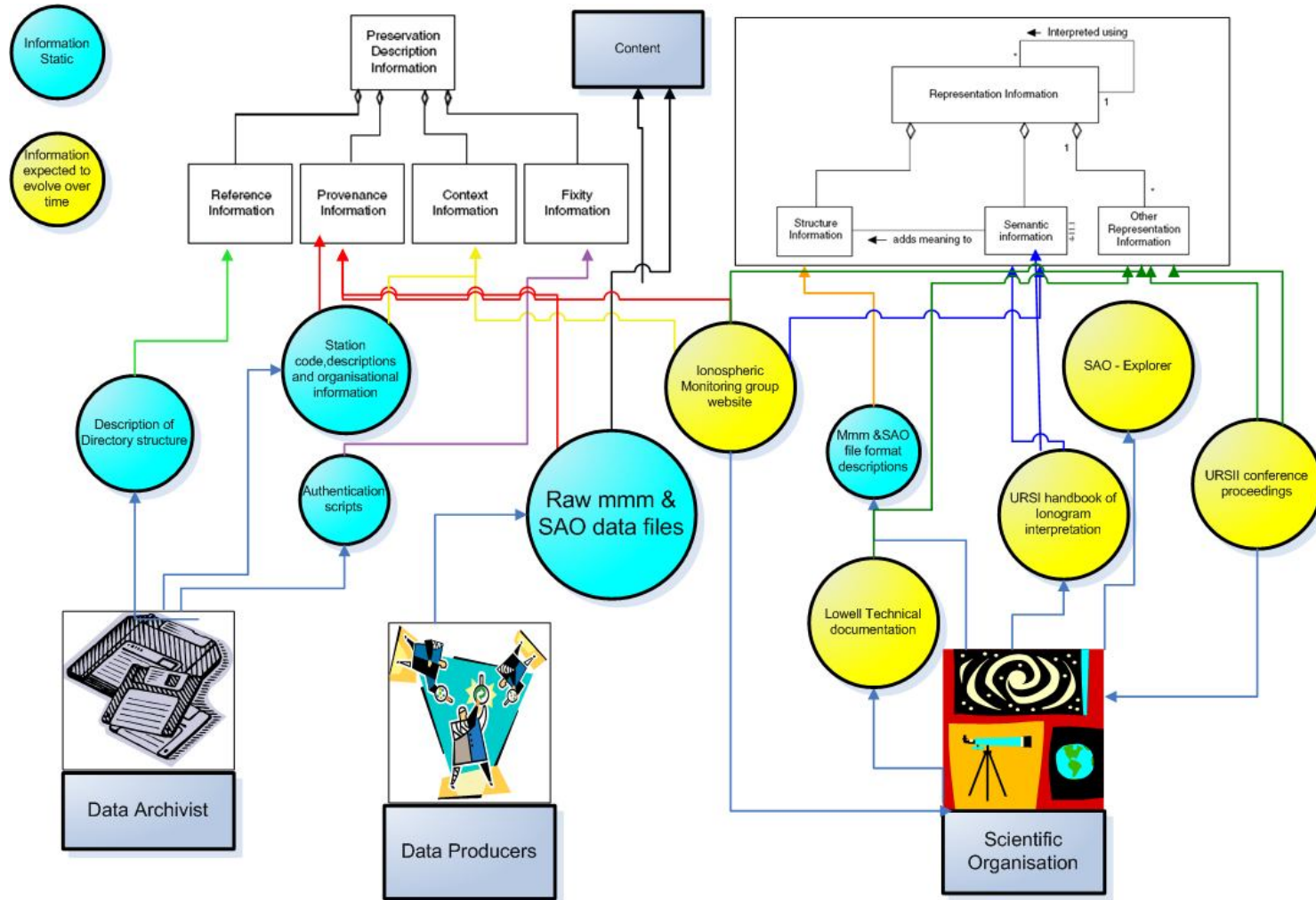
- Set of information objects
- Set of supply relationships
- Set of preservation strategies

Which allow you to carry out a series of clear actions in order to create an AIP. This allows you to take a number of plans to the cost/benefit stage.









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Questions ?