GSICS Procedure for Product Acceptance Update

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Joint GRWG-V and GDWG-IV Meeting

Toulouse, France

February 9, 2010

Agenda

- *GSICS Procedure for Product Acceptance Review*
- *GSICS Product Acceptance Form*
  - *General Information*
  - *Product summaries, justification, and requirements*
  - *Product theoretical basis and traceability to reference standards*
  - *Product Implementation: Software and supporting models and measurements*
  - *Product version control*
  - *Product quality, access, and use information*

Reminder … Why A Product Acceptance Procedure?

1.90	0.053	191
536		0
2243		0
7.00	0.122	145
34.60	0.248	158
3.60	0.068	157
52.90		0
4.8		0
0.22		0

Données sans mètadonnées

NDB No. 19811
Snacks, potato chips, plain, unsalted

Refuse:0%

Nutrients and Units		Amount in 100 grams of edible portion: Mean	Std. Error	Number of Data Points	Deriv Code	Source Code	Confidence Code
Proximates:							
Water	g	1.90	0.053	191		1	
Energy	kcal	536		0	NC	4	
Energy	kJ	2243		0		4	
Protein (N x 6.25)	g	7.00	0.122	145		1	
Total lipid (fat)	g	34.60	0.248	158		1	
Ash	g	3.60	0.068	157		1	
Carbohydrate, by difference	g	52.90		0	NC	4	
Fiber, total dietary	g	4.8		0		4	
Sugars, total	g	0.22		0	0	4	
Starch	g						

Data with metadata

Composition of Foods
Raw, Processed, Prepared
USDA National Nutrient Database for Standard Reference, Release 22

Data with metadata and documentation

Confidence code—indicates the relative quality of the data. This code is derived using the data quality criteria first described by Mangels et al. (1993). These criteria have been expanded and enhanced for the NDBS (Holden et al., 2002). This field is included as a placeholder for future releases.

USDA National Nutrient Database for Standard Reference
http://www.ars.usda.gov/Services/docs.htm?docid=8964

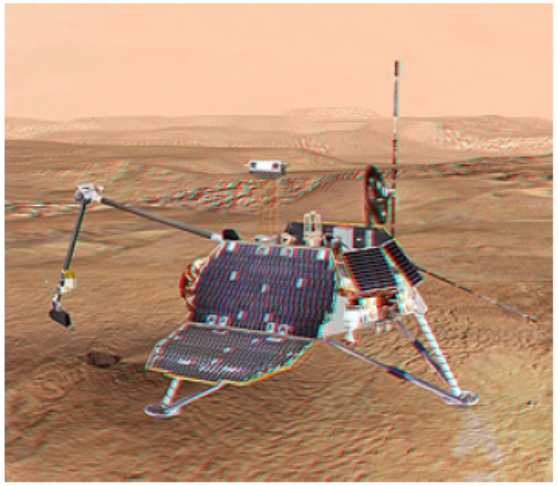
Reminder … Why A Product Acceptance Procedure?

Data transmission, like any other communication, relies on a clear understanding by the data user of the data they obtain.

Metric error caused Crash of Mars Orbiter

ASSOCIATED PRESS

WASHINGTON - Failure to convert English measures to metric values caused the loss of the Mars Climate Orbiter, a spacecraft that smashed into the planet instead of reaching a safe orbit, a NASA investigation confirmed Wednesday.



NASA VIA AP

The Mars Climate Orbiter, shown in an artist's rendering, was to relay information from another spacecraft on the planet's surface.

The orbiter, a key craft in the space agency's exploration of the red planet, vanished after a rocket firing Sept. 23 that was supposed to put the spacecraft on station around Mars.

An investigation board concluded that NASA engineers failed to convert English measures of rocket thrusts to newtons, a metric system measurement of rocket force. One English pound of force equals 4.45 newtons. A small difference between the two values caused the spacecraft to approach Mars at too low an altitude.

The investigation board found that the error went undetected in ground-based computers. Also, the mission's navigation team had an imperfect understanding of how the craft was pointed in space.

GSICS Procedure for Product Acceptance (GPPA) is the …

- GSICS product developers pathway to obtain a "Stamp of Approval" for a potential product
- GSICS data users window to GSICS product quality and "fitness for purpose"
- GSICS governing body reference for judging GSICS product fitness

Fundamental Capabilities of GPPA

For a potential GSICS product, the GPPA defines and documents:

- Scope of product within the GSICS product portfolio
- Theoretical basis, and implementation and distribution strategy, of product
- Product Quality (uncertainty, quality indicators, etc)

GPPA Leads to Three Product Distribution Modes:

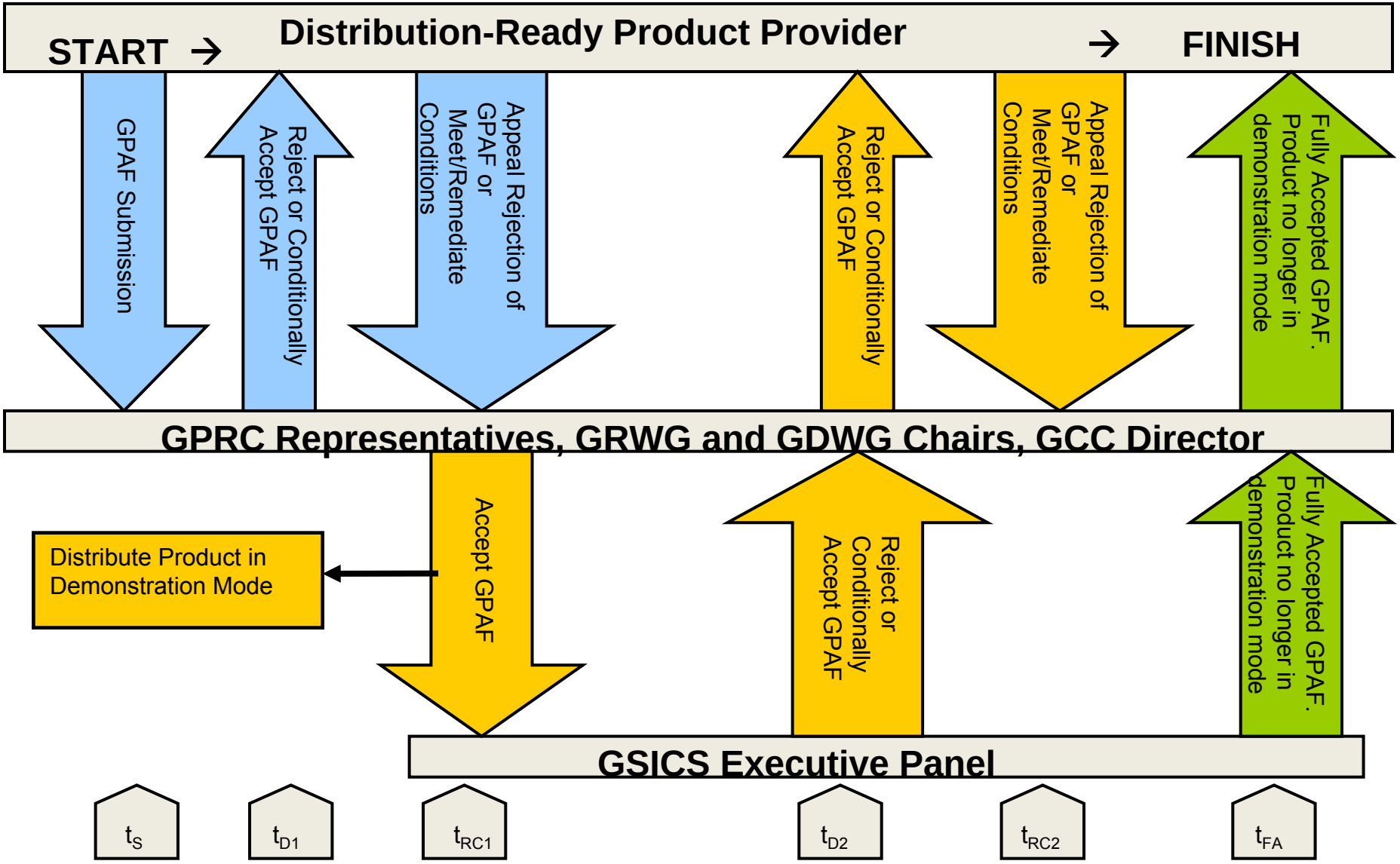
1) **Rejection Mode** - Not distributed as a GSICS product

2) **Demonstration Mode** - Favorable potential GSICS product implemented on an experimental basis without Executive Panel approval

3) **Full Acceptance Mode** - Final product acceptance given by the GSICS Executive Panel

GSICS Procedure for Product Acceptance

GPPA Flowchart



GPPA Elements

- Mature GSICS Product
- GSICS Product Acceptance Form
- Supporting Documentation
  - Product physical basis documents
  - Product implementation documents
  - Product operations/distribution documents

GSICS Product Acceptance Form (GPAF)

- EUMETSAT, JMA, and NOAA have begun the process of submitting their GEO-LEO IR products through the acceptance procedure.
- NOAA also has requested approval for an MSU/AMSUA temperature time series product.
- The first step is to fill out the GPAF.
- Some confusion has arisen while filling out the form.
- The remainder of this talk attempts to resolve some of the confusion.

GSICS Product Acceptance Form

Version 1.0

GSICS Coordination Center

November 2009

GPAF: Product Provider Information

SECTION I. Product Provider Information

I.1. Proposed Product Name	
I.2. Submitting Organization Name	
I.3. Point of Contact of Product Provider	
I.3.A. Name	
I.3.B. E-Mail Address	
I.3.C. Physical Address	
I.3.D. Phone	
1.3.E. FAX (Optional)	
1.3.F. URL (Optional)	

Name of product, what is the providing agency and whom is the person who gets contacted about the product.

GPAF: Product Information - Brief description, scope and requirements

GSICS product users determine initial fitness-for-purpose of a GSICS product by reading the brief description of the product and its purpose and specifications.

GSICS data providers can include this information in an attached "readme" file.

SECTION II. Product Information

II.1. Brief Product Description (1 page or less)

II.2. What is the product scope within GSICS? *(Describe the general significance and purpose of the product to the GSICS mission.)*

II.3. What are the general product function and performance specifications? *(These are the high-level design requirements of the product, which include what the product will do and how well it will do it.)*

GPAF: Product Documentation – Theoretical Basis and Traceability to Reference Standards

Product Documentation Helps Users "PACK"

- Properly use the product
- Access the data
- Clearly define product performance expectations
- Know product methodologies

In this GPAF section, a product provider is giving product evaluators information about product theoretical foundation, and its traceability to reference standards.

SECTION III. Product Documentation

III.1 Product Development

Product providers, evaluators, and users all need to know the detailed physical basis of the product. The documentation created for this section will be evidence of fulfillment of this goal.

III.1.A Algorithm Theoretical Basis Document (ATBD)

Discussion of physical principles supporting the product. This could be in the form of references to journal article(s), or stand-alone technical information. Needs to include an algorithm flowchart, including data I/O and logic, and process element descriptions.

Is the ATBD completed?

	Yes	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
	No	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
	Not /Applicable	What is the justification?

III.1.B Plan to Establish Measurement Traceability to Reference Standards

Describes the traceability chain to reference standards (preferably international measurement standards). If the measurement reference standard is not traceable to international standards, this clearly needs to be stated and justified.

Is the measurement traceability plan completed?

	Yes	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
	No	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
	Not /Applicable	What is the justification?

GPAF: Product Implementation – File and Parameter Naming Conventions

Defining Product Implementation Gives Users "CALM"

- Confidence that defined product generation, dissemination, and storage procedures are being followed
- Ability to justify use of the product
- Links between new and old versions of the product
- Means to know product limitations

III.2 Product Implementation
Procedures that meet current "best practices" in regards to establishing analysis software, harnessing radiative transfer models, and making calibration/validation measurements that are fundamental to implementing theory to create products.

III.2.A Establishing Analysis Software

III.2.A.1. Software creates data files that meet GSICS file naming conventions documented on the GSICS Wiki at https://cs.star.nesdis.noaa.gov/twiki/bin/view/GSICS/NetcdfFilenames?

☐	**Yes**	Please write a sample file name below:
☐	**No**	When is this to be completed and available?
☐	**Not /Applicable**	What is the justification?

III.2.A.2. Software creates data files that meet GSICS parameter naming conventions documented on the GSICS Wiki at https://cs.star.nesdis.noaa.gov/twiki/bin/view/GSICS/NetcdfConvention?

☐	**Yes**	Please electronically submit a sample data file to be scanned by the GCC for adherence to the GSICS parameter naming convention.
☐	**No**	When is this to be completed and available?
☐	**Not /Applicable**	What is the justification?

In Parts A.1-2 of this GPAF section, a product provider needs to clearly reveal their product file and parameters naming conventions. In GSICS, we are adopting standards to be used by all members.

GPAF: Product Implementation – Software Architecture and Version Control

In Parts A.3-4 of this GPAF section, a product provider needs to provide access to documents that describe

- **Flow and function of data processing software used to create the product**
- **Method(s) used to track and archive software updates and changes**

III.2.A.3. Software documentation - consists of flow charts, module descriptions, revision descriptions, and programmer contact information.

Is the software documentation complete?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

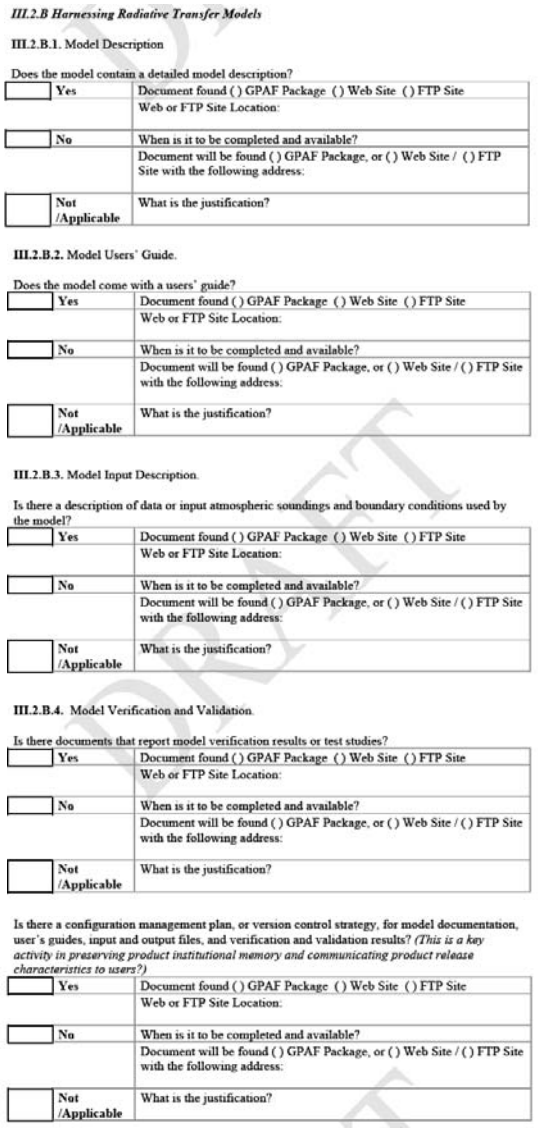
Is there a configuration management plan, or version control strategy, for software and its documentation? *(This is a key activity in preserving product institutional memory and communicating product release characteristics to users?)*

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

GPAF: Product Implementation – Use of Models in Product Generation

In Parts B.1-5 of this GPAF section, a product provider needs to provide access to documents that describe the following aspects of radiative transfer, weather prediction, climate, or cloud models used to make a GSICS product:

- **Overall description**
- **User's guidelines**
- **Input parameters**
- **Verification and validation of model output**
- **Version control**



III.2.B Harnessing Radiative Transfer Models

III.2.B.1. Model Description

Does the model contain a detailed model description?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site Web or FTP Site Location:
☐	**No**	When is it to be completed and available? Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

III.2.B.2. Model Users' Guide.

Does the model come with a users' guide?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site Web or FTP Site Location:
☐	**No**	When is it to be completed and available? Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

III.2.B.3. Model Input Description.

Is there a description of data or input atmospheric soundings and boundary conditions used by the model?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site Web or FTP Site Location:
☐	**No**	When is it to be completed and available? Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

III.2.B.4. Model Verification and Validation.

Is there documents that report model verification results or test studies?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site Web or FTP Site Location:
☐	**No**	When is it to be completed and available? Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

Is there a configuration management plan, or version control strategy, for model documentation, user's guides, input and output files, and verification and validation results? *(This is a key activity in preserving product institutional memory and communicating product release characteristics to users?)*

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site Web or FTP Site Location:
☐	**No**	When is it to be completed and available? Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

GPAF: Product Implementation – Use of Measurements to Support Cal/Val

In Parts C.1-2 of this GPAF section, a product provider needs to provide access to documents that describe supporting cal/val measurements – e.g., desert or moon radiometric characterization:

- **Measurement procedures and instrumentation**
- **Measurement uncertainty**
- **Verification and/or validation of measurements**
- **Version control for data sets**

III.2.C Making Measurements to Support Cal/Val *(For example, measurements made to characterize a calibration target, such as monitoring platinum resistance thermometer temperatures of an external blackbody in thermal vacuum or making sea surface temperature measurements for SST validation.)*

During the cal/val process, supporting measurements are sometimes made to assess or ensure the quality of the calibration activity. To properly record these measurements, in addition to documenting the data, a measurement procedure outline needs to be written that gives a description of the instruments involved, as well as information needed to know how the measurement(s) was taken and under what conditions.

Are there documents available that outline the process of taking measurements that support cal/val, as well as summarize the results of these measurements?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

Is there a configuration management plan, or version control strategy, for documents associated with supporting cal/val measurements? *(This is a key activity in preserving product institutional memory and communicating product release characteristics to users?)*

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

GPAF: Product Implementation – Product Update Strategy

In Parts D of this GPAF section, a product provider needs to provide access to documents outlining version control for their product. Should we create a standard method to archive and disseminate GSICS products?

III.2.D Product Version Control Plan

Is there a configuration management plan, or version control strategy, for product output data and metadata? *(This is a key activity in preserving product institutional memory and communicating product release characteristics to users?)*

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

GPAF: Product Quality Assessment and Operations/Distribution

Product QA and O/D Helps Users "SAVE"

- Seek assistance in using GSICS products
- Access current and archived products efficiently
- Vastly reduce to time needed to implement product
- Evaluate product fitness-for-purpose

In Parts 3A-C of this GPAF section, a product provider needs to provide access to documents that clearly describe to users how to access, use, and assess the quality of a GSICS product.

III.3.A Product Quality Documents

Are there documents that describes and quantifies the detailed sources of product uncertainty?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

III.3.B Operations/Distributions Plan

Outlines how the data or results are to be stored and shared through GSICS network computers. A statements about the level of access need to be included here.

Is there an Operations/Distribution Plan?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

III.3.C Data User's Guide

A document the detailing data format, quality flags and parameter descriptions. It must identify how data format meets GSICS standards, and the limitations of product use.

Is there a Data Users Guide?

☐	**Yes**	Document found ( ) GPAF Package ( ) Web Site ( ) FTP Site
		Web or FTP Site Location:
☐	**No**	When is it to be completed and available?
		Document will be found ( ) GPAF Package, or ( ) Web Site / ( ) FTP Site with the following address:
☐	**Not /Applicable**	What is the justification?

Summary

- *GSICS Procedure for Product Acceptance (GPPA) is a process adopted to define GSICS data quality assurance. This benefits GSICS members and product users.*
- *There needs to be some discussion about GSICS product scope – Raw Data Correction Coefficients, Fundamental Climate Data Records, Environmental Data Records, Climate Data Records, … etc.*
- *A successful GPPA documents the following:*
  - Requirements, ideas and processes used to create a product
  - The quality of the product relative to available reference standards
  - The procedure followed to access and use a product