

SPACEBEL / ESA-ESRIN

DRAFT Acceptance Test Plan for the EO Product Catalogue for VITO CVB



Researchpark Haasrode
Interleuvenlaan 5
B-3001 Heverlee

Tel. +32 (0)16 40 30 39
Fax +32 (0)16 40 69 39

info@gim.be
<http://www.gim.be>

BTW-BE-0454.064.819
RPR Leuven
Fortis: 230-0392124-70

G.I.M. Geographic Information Management nv
C08701B
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SIGNATURES

	Name	Date	Signature
Authors:	Tim VanderBorgh	2009/06/30	
Reviewed by:	An Heirman	2009/07/13	
Approved by:	Steven Smolders	2009/07/14	

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1 INTRODUCTION

1.1 PURPOSE

This document is the Acceptance Test plan of the HMA EO Product Catalogue for the VITO Centrum voor Beeldverwerking (CVB). It is formal deliverable identified in WP3000 of the GIM-VITO-ERDAS proposal submitted for the Heterogeneous Missions Accessibility - Testbed (HMA-T) Phase 2 call in reply to the joint Spacebel/ESA ITT AO/HMA-T-2/780 – HMA Testbed Phase 2 [AD01].

1.2 SCOPE

The objectives of the HMA-Testbed project are

1. To permit the evolution and testing of the interoperability standards which have been initially defined within the Heterogeneous Missions Accessibility contract, in parallel with the EO Data Access Integration Layer EO-DAIL implementation and the implementation of the specified interfaces within the partners' ground segments.
2. To permit the conformance testing of the HMA adopted standards and to support industry and institutions in the testing of their own products or developments.
3. To support the take-up of HMA defined standards by European Institutional Users (e.g. INSPIRE Legally Mandated Organisations (LMOs) and geospatial software product developers).

The work performed by our Consortium headed by GIM and further consisting of VITO and ERDAS focuses on the EO Product metadata and HMA Product Catalogs.

- The EO Product Metadata standardised within the GML 3.1.1 Application schema for Earth Observation products specification (OGC06-080) has been applied to a set of representative VITO EO Products. This study work did allow testing of this specification on a range of products and did lead to the creation of specific derived GML application schemas (as foreseen by this specification). It also provided VITO with the required experience to allow future adoption of this specification as common EO Product Metadata format.
- Once this study was completed, one of the VITO systems was selected for the implementation of an HMA Catalog. This Catalog prototype was setup using the ERDAS Catalog software and was implemented by and hosted at GIM and filled with a representative set of metadata provided by VITO and converted and harvested by GIM. The Catalog Service instance is compliant with the OGC Catalogue Services Specification 2.0 Extension Package for ebRIM Application Profile: Earth Observation Products, further referred to as EO EP within this document.
- Subsequently this Catalogue Service is integrated in the ESA HMA/SSE Portal. Two Clients for this Service are developed. The first Catalogue service instantiation uses the GetRecords and GetRecordsById operation like normal practice with EO Products Extension Package ebRIM CSW Catalogues in the HMA context. A second service that uses the alternative GetRepositoryItem operation has also been developed.

The subject acceptance test plan describes the validation approach that is utilised to both validate conformance of the EO EP Catalogue Service instances as well as the integration with the HMA/SSE Portal.

To note is that at the moment of writing there was no single harmonised set of compliance tests for validating the Catalogue service instances. Instead several partial sets of compliance tests were used. An updated version of this document will be provided once such a harmonised set of compliance tests will become available.

1.3 APPLICABLE DOCUMENTS

AD01	Invitation to tender AO/HMA-T-2/780- HMA Testbed Phase 2, Hoeilaart, 31 January 2008,
AD02	Statement of Work SPB-HMA-T-SOW-002- Issue 1 - Rev. 0, 31 January 2008
AD03	Appendix 3 To Spacebel AO/HMA-T-2/780: Special Conditions of Tender
AD04	Appendix 2 to Spacebel AO/HMA-T-2/780: Draft Contract
AD05	ECSS Space Engineering Standards – Software ECSS E-40B (with tailoring)
AD06	Management, Administrative and Financial proposal - EO Profile of GML and HMA Product Catalog for VITO CVB, CP08028B/SS/ss/001/v01 (2008-04-11)
AD07	Technical proposal HMA-T Phase 2 EO Profile of GML and HMA Catalog for VITO CVB, CP08028B/SS/ss/002/v01 (2008-04-11)
AD08	GML 3.1.1 Application schema for Earth Observation products, OGC 06-080r4, Version 0.9.3, dated 2008/07/21
AD09	HMA-T-MOM-2003-SPB, HMA-T PDR / Progress Meeting 26 November 2008 Minutes of Meeting
AD10	HMA-T-TN-0002-GIM, Issue 1.2, 2009-07-07, Technical Note on the application of the GML 3.1.1 Application Schema for EO Products to the VITO EO product collections
AD11	OGC Catalogue Services Specification 2.0 Extension Package for ebRIM Application Profile: Earth Observation Products, Version: 0.2.0, OGC 06-131r5
AD12	HMA-T-MOM-2005-SPB, HMA-T AR-1 CDR Meeting 18-19 February 2009 - Minutes of Meeting
AD13	OGC CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW, version 1.0.1, 2009/02/05, OGC 07-110r4
AD14	OGC CSW-ebRIM Registry Service – Part 2 : Basic extension package, version 1.0.1, 2009/02/05, OGC 07-144r4
AD15	HMA-T-TN-0003-GIM, Technical Note on the design of the HMA EO Product Catalogue for VITO CVB

1.4 REFERENCE DOCUMENTS

RD01	HMA-T-MOM-2008-SPB ; HMA-T AR-2 Part 1 (CNR)
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1.5 ACRONYMS

BAE	Burnt Area Estimate
CSW	Catalogue Services for Web
CVB	VITO Centrum voor Beeldverwerking
DMP	Dry Matter Productivity
EO	Earth Observation
EO EP	OGC Catalogue Services Specification 2.0 Extension Package for ebRIM Application Profile: Earth Observation Products,
ESA	European Space Agency
ESRIN	European Space Research Institute
FAPAR	Fraction of Absorbed Photosynthetically Active Radiation

fCover	Fractional cover
GeoSuccess	Global Earth Observation in Support of Climate Change and Environmental Security Studies
GML	Geographic Mark-up Language
GUI	Graphical User Interface
HDF	Hierarchical Data Format
HMA	Heterogeneous Missions Accessibility
HTTP	Hyper Text Transfer Protocol
ICD	Interface Control Document
ITT	Invitation to Tender
LAI	Leaf Area Index
MIR	Mid-Infrared
MVC	Maximum Value Composite
NDVI	Normalized Difference Vegetation Index
NIR	Near Infra red
NEP	Net Ecosystem Productivity
NPP	Net Primary Productivity
PAR	Photosynthetically Active Radiation
N/A	Not Applicable
OGC	Open Geospatial Consortium
SOW	Statement of Work
SWIR	Short wave Infrared
VGT-P	Vegetation Physical Values
VGT-S1	Vegetation Synthesis over 1 day
VGT-S10	Vegetation Synthesis over 10 days
VGT-D10	Vegetation bidirectional Synthesis over 10 days
VPI	Vegetation Productivity Indicator

2 ORGANISATION OF TEST ACTIVITIES

2.1.1 Activity Definition

The objective of these acceptance tests is to check that

- The EO EP ebRIM CSW Catalogue instances are conformant with the specification by running the compliance tests
- The Catalogue Services are correctly integrated in the HMA/SSE Portal.

The acceptance tests are run at GIM premises.

The following tasks are part of the factory acceptance:

- Execution of the formal acceptance tests,
- Verification of the availability of the documentation,
- Check if the necessary hardware is present to perform the tests.

The set of tests defined in this document will be executed as follows:

1. Factory Acceptance Tests run by GIM staff from GIM premises
2. A subset of these acceptance tests is repeated during the Acceptance Review Meeting

2.1.2 Participants

The Factory Acceptance test is lead by GIM, executed by a test engineer (GIM) and witnessed by a QA engineer (GIM).

The tests during the Acceptance review meeting and witnessed by Spacebel, the prime contractor of the HMA-T project and the ESA Technical Officer.

It is the responsibility of the test engineer to fill the "pass/fail" column on the test procedure sheets in the Test Procedures document. The Factory Acceptance Test session shall be minuted.

2.1.3 Description of a Factory Acceptance Session

The Factory Acceptance Test session starts with the verification of the testing environment and the presence of all required people. During this verification it will be checked whether the software is ready to be submitted to the factory acceptance tests (e.g. open actions, open change requests, state of documentation, list of open problem reports raised during integration and validation phase, ...).

The next activity is the execution of the formal factory acceptance. If one detects a difference between the observed behaviour of the software and the expected behaviour described in the Test Procedures, then the test engineer raises a problem report. In case a blocking problem is encountered, the test case is skipped and testing continues with the next test case.

Finally at the end of the session, a Factory Acceptance Test Report is written. Depending on the number of major problems that are detected, a retest of some test cases may be appended to the testing activities, if a new release with a number of corrections is available.

3 EO EP FOR eBRIM CSW AP COMPLIANCE TESTS

3.1 INTRODUCTION

This section describes the test procedures that are to be followed for conformance testing of EO EP Catalogues using the executable compliance test scripts. At the moment of writing three versions of these test scripts are available, respectively provided by IMAA-CNR, IGN and INTECS.

This section of this document is to be updated when a harmonised set of compliance tests will become available. Alignment with the proposed structure for Acceptance Test plan as outlined in [RD01] is also foreseen for a next revision of this document.

3.2 IMAA-CNR COMPLIANCE TESTS

3.2.1 Scope of tests

According to the information available at the testing site, this test suite is based on the following OGC specifications:

- Extension Package for ebRIM Application Profile: Earth Observation Products, version 0.2.2 [OGC 06-131r4]
- CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW, version 1.0.1 [OGC 07-110r4]
- CSW-ebRIM Registry Service – Part 2: Basic extension package, version 1.0.1 [OGC 07-144r4]
- CSW-ebRIM Registry Service – Part 3: Abstract Test Suite, version 1.0.1 [OGC 08-103r2]
- OpenGIS Catalogue Services Specification, version 2.0.2 [OGC 07-006r1]
- OpenGIS Web Services Common Specification, version 1.1.0 [OGC 05-008c1]
- OASIS ebXML Registry Information Model, version 3.0.1 [regrep-rim]
- GML 3.1.1 Application schema for Earth Observation products, version 0.9.0 [OGC 06-080r2]

The following aspects are tested:

- Package availability
- EO Product correctness
- EO Product classification
- EO Product metadata grouping
- SOAP 1.2 protocol binding
- EO Product acquisition parameters mapping
- EO Product additional metadata mapping
- Harvest operation support
- GetRecords internal coherence on beginPosition
- GetRecords internal coherence on classification

What is not tested is:

- CSW specification
- ebRIM specification

3.2.2 Test engine connection information

The compliance testing team engine can be found at <http://zeus.pin.unifi.it/teamengine/>. Compliance tests are to be run using StevenSGIM as login.

3.2.3 Test Case VT01.01 IMAA CNR Test engine – catalogue with extended metadata

3.2.3.1 Purpose

The purpose of this test case is to verify the compliance of our Catalog instance with the EO EP and underlying specifications. This test case is run against the Catalogue in which we have harvested metadata with the vgt extended GML Application schema. Some of these test cases will fail as the compliance tests verify the correspondance between ebRIM slots and elements within the EO Profile of GML in which the namespace prefix for some elements is presumed to be fixed to eop.

3.2.3.2 Procedure steps

- Open a browser and navigate to <http://zeus.pin.unifi.it/teamengine/>.
- Logon with the username/password
- Click on create a new session
- Select
 - test suite CNR-IMAA
 - standard: eop_ep
 - version: 0.2.2
 - test suite Rev: Release
 - Select the “CSW ebRIM extension package for Earth Observation Products compliance test suite”
 - Enter a name for the test session
 - Enter the URL to the Catalogue Service instance with VGT GML ingested:
<http://193.74.120.28/ionicwrs/wrs/WRS>
 - Enter an Id for a registry package that represents an EOProduct:
“urn:ogc:def:EOP:VITO:VGT4AFRICA:FCOVER:VGT4AFRICA_FCOVER_20080101_Africa_POSTEL_POSTEL:RP”
 - Leave begin position unadapted
 - Do not perform the harvest test.

3.2.3.3 Expected Outcome

The expected outcome is a report that shows the test cases that are passed and that are failed or for which there is a warning. In principle – when all test cases are correct- all test cases should pass except for the test cases that do a literal comparison between EO ebRIM slots and EO Profile of GML element.

3.2.4 Test Case VT01.02 IMAA CNR Test engine – catalogue with eop metadata

3.2.4.1 Purpose

The purpose of this test case is to verify the compliance of our Catalog instance with the EO EP and underlying specifications. This test case is run against the Catalogue in which we have harvested metadata with the normal eop GML application schema.

3.2.4.2 Procedure steps

- Open a browser and navigate to <http://zeus.pin.unifi.it/teamengine/>.
- Logon with the username/password
- Click on create a new session
- Select

- test suite CNR-IMAA
- standard: eop_ep
- version: 0.2.2
- test suite Rev: Release
- Select the “CSW ebRIM extension package for Earth Observation Products compliance test suite”
- Enter a name for the test session
- Enter the URL to the Catalogue Service instance with normal eop GML ingested:
<http://193.74.120.28/ionicwrs3/wrs/WRS>
- Enter an Id for a registry package that represents an EOProduct:
“urn:ogc:def:EOP:VITO:VGT4AFRICA:FCOVER:VGT4AFRICA_FCOVER_20080101_Africa_POSTEL_POSTEL:RP”
- Leave begin position unadapted
- Do not perform the harvest test.

3.2.4.3 Expected Outcome

The expected outcome is a report that shows the test cases that passed or failed or for which there is a warning. In principle – in case all test cases are implanted correctly - all test cases should pass.

3.3 IGN COMPLIANCE TESTS

3.3.1 Scope of tests

The tests described in this section are the consolidated tests provided by IGN.

This section is to be completed in a next version of this document.

3.3.2 Test engine connection information

The compliance testing team engine can be found at <http://cite.ign.fr/teamengine/>. Compliance tests are to be run using the StevenSGIM as login.

3.3.3 Test Case VT01.03 IGN Test engine – catalogue with eop metadata

3.3.3.1 Purpose

The purpose of this test case is to verify the compliance of our Catalog instance with the EO ebRIM EP and underlying specifications. This test case is run against the Catalogue in which we have harvested metadata conforming to the “normal” eop GML application schema.

3.3.3.2 Procedure steps

- Open a browser and navigate to <http://cite.ign.fr/teamengine/>
- Logon with the username/password
- Click on create a new session
- Select
 - Organisation : OGC
 - standard: CSW EO EP
 - version: 0.2.4
 - test suite Rev: 0

- Enter a name for the test session
- Set the IUT URL to : http://193.74.120.28/ionicwrs/wrs/WRS
- Enter an Id for a registry package that represents an EOProduct:
“urn:ogc:def:EOP:VITO:VGT4AFRICA:FCOVER:VGT4AFRICA_FCOVER_20080101_Africa_POSTEL_POSTEL:RP”
- Set the CSW Conformance level to 1: ReadOnly
- Set the target EO EP conformance level to “The Core EOP support”

3.3.3.3 Expected Outcome

The expected outcome is a report that shows the test cases that passed or failed or for which there is a warning. In principle – in case all test cases are implemented correctly- all test cases should pass.

3.4 INTECS COMPLIANCE TESTS

3.4.1 Scope of tests

The tests described in this section are the consolidated tests provided by INTECS in the frame of the ERGO project.

3.4.2 Test engine connection information

A compliance testing team engine hosting these tests is at the moment of writing to our knowledge not publicly available. Tests were run once on 16/06/2009 from the development environment with support of Intecs staff.

3.4.3 Test Case VT01.04 INTECS Compliance tests – Catalogue with extended VGT metadata schema

3.4.3.1 Purpose

The purpose of this test case is to verify the compliance of our Catalog instance with the EO ebRIM extension package and underlying specifications. This test case is run against the Catalogue in which we have harvested metadata conforming to the vgt extended GML application schema. Some of these test cases will fail as the compliance tests verify the correpondance between ebRIM slots and elements within the EO Profile of GML in which the namespace prefix for some elements is presumed to be fixed to eop.

3.4.3.2 Procedure steps

To be updated once tests will become available online.

- Open the Development Environment
- Provide the URL to the EO EP Catalog Service
- Provide a valid identifier.
- Run the tests

3.4.3.3 Expected Outcome

The expected outcome is a report that shows the test cases that are passed and that are failed or for which there is a warning. In principle – in case all test cases are correct- all test cases should pass.

4 HMA PORTAL INTEGRATION TESTS

4.1 INTRODUCTION

In this section a set of tests is presented that allow verification of the correct integration of the EO EP Catalogs in the HMA/SSE Portal.

Two Catalog instances are integrated as described in [AD15].

- The first Catalog instance is integrated using the Default GetRecords and GetRecordById operations. The workflows that were developed for this kind of catalogue can in principle be used without change. In this Catalogue instance, the metadata contained within the extended schemas will not be visible. As this extended metadata is not harvested into ebRIM slots it will not appear in GetRecords Responses.
- The second Catalogue client instance will use the GetRepositoryItem operation to show that the extended metadata encoded in vgt schema elements can be extracted from the Catalogue. The default workflow for the present operation is here to be replaced by a specific workflow that calls the GetRepositoryItem operation.

4.2 CATALOGUE INTEGRATION WITH DEFAULT WORKFLOW

4.2.1 Test Case VT02.01 Test the GetRecords operation

4.2.1.1 Purpose

The purpose of this test case is to verify the correct integration of the Catalogue Services with the HMA Portal for what concerns the “Search operation” implemented using GetRecords.

4.2.1.2 Procedure steps

1. Open an Internet browser
2. Navigate to <http://services-test.eoportal.org/>
3. Login with the GIM Service provider user account (required as long as the service is in testing mode)
4. Search for VGT4Africa2
5. Click on the search button
6. Select the VGT4Africa – Normalised Difference Water Index collection
7. Draw an AOI over Africa
8. Specify a start date of 01 January 2008 and an enddate of 10 January 2008
9. Click on Search
10. Change the end date to 31 of December 2008
11. Click on search
12. Change the collection to VGT4Africa BioGeoPhysical / Fractional Cover product
13. Click on search
14. Select the product collections Normalised Difference Water Index, Fractional Cover, Leaf area Index and BioGeoQuality
15. Click on search
16. Enter a start date of 01 Jan 2009 and an enddate of 30 jan 2009

17. Click on search
18. Enter a start date of 01 January 2008 and an enddate of 10 January 2008 and draw an AOI that does not overlap with Africa
19. Click on search
20. Draw an AOI over Africa and select the Vegetation Productivity Indicator as only collection
21. Click on Search and then click on the “Select Product” check box.

4.2.1.3 Expected Outcome

- After step 5, verify that a catalog Search page is opened that allows the user to select out of the list of 18 product collections
- After step 9 verify that metadata of 1 NDWI product is returned with a start date of 2008-01-01 and an enddate of 2008-01-10 and that summary metadata is presented for this single matching record
- After step 11 verify that metadata of 18 NDWI products are returned with dates varying between January 2008 and June 2008
- After step 13, verify that metadata of 18 fCover products are returned with dates varying between January 2008 and June 2008
- After step 15, verify that metadata of 72 products are returned with dates varying between January 2008 and June 2008 and belonging to collections Normalised Difference Water Index, Fractional Cover, Leaf area Index and BioGeoQuality.
- After step 17, verify that per collection a message is shown that there are no matching records for this collection with the current search parameters.
- After step 19, verify that no products are returned and that per collection a message is shown that there are no matching records for this collection with the current search parameters.
- After step 21, verify that the product gets highlighted on the map.

4.2.2 Test Case VT02.02 Test the GetRecordById operation

4.2.2.1 Purpose

The purpose of this test case is to verify the correct integration of the Catalogue Services with the HMA Portal for what concerns the “Present operation” implemented using the GetRecordById operation.

4.2.2.2 Procedure steps

1. Open an Internet browser
2. Navigate to <http://services-test.eoportal.org/>
3. Login with the GIM Service provider user account (required as long as the service is in testing mode)
4. Search for VGT4Africa2
5. Click on the search button
6. Select the VGT4Africa – Normalised Difference Water Index collection
7. Draw an AOI over Africa
8. Specify a start date of 01 January 2008 and an enddate of 10 January 2008
9. Click on Search
10. Click on the metadata button

4.2.2.3 Expected Outcome

- After step 10, verify that a popup window is shown that provides more metadata for this particular product. This extended metadata contains basic acquisition and archiving centre information.

4.3 CATALOGUE INTEGRATION WITH GETREPOSITORYITEM WORKFLOW

4.3.1 Test Case VT02.03 Test the GetRepositoryItem operation

4.3.1.1 Purpose

The purpose of this test case is to verify that by using the GetRepositoryItem operation, the extended metadata as defined in the vgt GML application schema can be retrieved

4.3.1.2 Procedure steps

1. Open an Internet browser
2. Navigate to <http://services-test.eoportal.org/>
3. Login with the GIM Service provider user account (required as long as the service is in testing mode)
4. Search for VGT4Africa and select the “VGT4Africa RepositoryItem” service
5. Click on the search button
6. Select the VGT4Africa – Normalised Difference Water Index collection
7. Draw an AOI over Africa
8. Specify a start date of 01 January 2008 and an enddate of 10 January 2008
9. Click on Search
10. Click on the metadata button.

4.3.1.3 Expected Outcome

- After step 10, verify that more extended metadata is shown in a popup window for this particular product. This extended metadata contains the information as defined in the vgt derived GML application schemas.