HMA-S TASK 7
Earth Observation Satellite Tasking Demonstrator Technical Note (D7000.4) & User Manual (D7000.4.2)

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<td></td>
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</tr>
<tr>
<td>Astrium HMA-S Project Team</td>
<td>20/05/2014</td>
<td></td>
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<tr>
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<td></td>
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<tr>
<td>Nicolas FANJEAU</td>
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<td>Approved by:</td>
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<td>Claudio GIZZI</td>
<td>20/05/2014</td>
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<td>Astrium Ltd.</td>
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<td></td>
<td></td>
<td>5.2.3</td>
<td>Add URLs for OpenSearch description documents</td>
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EXECUTIVE SUMMARY

The state of play of the standardization of the ground segment interfaces for EO missions is described in [RD01] and [RD02]. The figure below, taken from [RD01] highlights the existing space standards, mainly from the European Cooperation for Space Standardisation (ECSS), covering the overall earth observation process, and the interfaces where the harmonization work within the HMA projects is focused.

Figure 1 Earth Observation Ground Segment Components [RD01]

The objective of “Heterogeneous Missions Accessibility” – HMA” is to establish harmonised access to heterogeneous earth observation (EO) missions’ data from multiple mission ground segments, including national missions and ESA Sentinel missions. In practice, the goal of HMA is to standardise the ground segment interfaces of the satellite missions for easier access to EO data. The HMA Architecture Working Group (AWG) has been coordinating the ground segment interface harmonisation activities initiated by the Ground Segment Coordination Body (GSCB). These activities, which were performed under ESA contracts such as HMA-I, HMA-T and most recently HMA-Follow On (HMA-FO) have produced interface specifications standardised through the OGC Consortium. The so-called “HMA Cookbook” [RD02] describes in detail the domains which have been subject to standardisation.
The ground segment interfaces covered by HMA-related projects and in various stages of standardisation at the Open Geospatial Consortium (OGC) include:

- Dataset (i.e. Product) metadata: OGC 06-080 and OGC 10-157,
- Catalogue Access (datasets): OGC 06-131, OGC 10-189,
- Catalogue access (dataset series and services) OGC 07-038, OGC 08-197,
- Feasibility Analysis: OGC 10-135,
- Ordering: OGC 06-141,
- On-line data access: including EO WMS and EO WCS OGC 10-140 and related specifications OGC 09-110 (WCS 2.0 Core), OGC 09-147 (KVP binding), OGC 09-148 (XML/Post binding), OGC 09-149 (XML/SOAP binding), OGC 11-053 (CRS Extension), etc.
- Identity management: OGC 07-118 [AD05].

The HMA-S project is the continuation of the standardisation activities from HMA-T and HMA-FO. The HMA-S project aims to further advance the HMA standardisation activities and address in particular the following interfaces:

- Dataset metadata (Task 3),
- Catalogue access (datasets, dataset series and services) (Task 4 and 5),
- Feasibility analysis (Task 7),
- Ordering and product download (Task 4),
- Processing (Task 6),
- Identity Management (Task 2) [AD05].

The objectives of the HMA-S demonstrators are on one hand to re-use existing applications to optimise the effort and maintain a set of open-source reference implementations within the scope of HMA. On the other hand, the demonstrators need to be made available as a standalone version for independent download and use; but also integrated into the HMA-S Test Bed for online access.
1. INTRODUCTION

1.1 Purpose of the Document

This document is the “Earth Observation Satellite Tasking Demonstrator Technical Note & User Manual” Technical Note. It is prepared by Astrium Ltd as a deliverable of WP700 of the HMA for Science (HMA-S) project. It is identified as HMA-S.ASU.D7000.4 and provides both a description of the native interfaces (HMA-S.ASU.D7000.4.1) and the user manual (HMA-S.ASU.D7000.4.2) for the demonstrator.

The main purpose of the present document is to provide guidance for understanding, deploying and configuring the EO Satellite OpenSearch Tasking Demonstrator in the context of HMA-S. It provides references and links to documents and software packages.

1.2 Scope of the Document

This document corresponds to the deliverables:

- HMA-S.ASU.D7000.4 (Demonstrator TN) as identified in WP7000, satisfies Task 7 I50.2 requirement in the Statement of Work (SOW) [AD03].
- HMA-S.ASU.D7000.4.1 (Description of the native interfaces) as identified in WP7000, satisfies Task 7 I50.2.1 requirement in the Statement of Work (SOW) [AD03].
- HMA-S.ASU.D7000.4.2 (User Manual) as identified in WP7000, satisfies Task 7 I50.2.2 requirement in the Statement of Work (SOW) [AD03].

The present document provides the main concepts of the EO Satellite OpenSearch Tasking Demonstrator of HMA-S; it explains the role of the different components as well as the ways they can be deployed and configured. The present document does not cover the internal interfaces or the architecture of the individual components.

1.3 Readership of the Document

This document is intended to be read by the HMA-S project team and the ESA Technical Officer. The target audience also includes software architects, system integrators and system administrators.

1.4 Organisation of the Document

This document is organised as follows:

- Chapter 1 is the introduction to this document.
- Chapter 2 lists the applicable and reference documents.
- Chapter 3 terms, definitions and abbreviated terms.
- Chapter 4 describes the high level architecture of the Demonstrator and the main interfaces.
- Chapter 5 contains the installation instructions for the Demonstrator.
- Chapter 6 is the user manual for the online version of the Demonstrator.
- Annexe sizing requirements, Virtual Machine Creation and COTS Installation.

1.5 Applicability of the Document

This document applies to Task 7 of the HMA-S project.
2. APPLICABLE AND REFERENCE DOCUMENTS

2.1 Applicable Documents

The following documents are applicable to the project. In the current document, these documents are referenced as listed below.

[AD01] HMA-S Project Management Plan, HMA-S.ASU.D100.1, Issue 1
[AD02] ECSS – Space Engineering Standards, ECSS-E-ST-40C, 6 March 2009
[AD03] Statement of Work LTDP-GSEG-EOPG-SW-12-0007, Heterogeneous Missions Accessibility for Science, Issue 1, Revision 0, 13/09/2012
[AD04] HMA-S.TRD.D4000.1: OGC® OpenSearch GeoSpatial and Temporal Extensions, 2013/05/30. This document corresponds to the OGC 10-032 document created as part of the WP 4000 of the HMA-S project.
[AD05] HMA-S.TRD.D4000.2: OpenSearch Extension for Earth Observation Products, 2013/05/30. This document corresponds to the OGC 13-026 document created as part of the WP 4000 of the HMA-S project.
[AD06] HMA-S.ASU.D7000.1: OGC OpenSearch Extension for Feasibility, 2013/06/13. This document corresponds to the OGC 13-039 document created as part of the WP 7100 of the HMA-S project.

2.2 Reference Documents

The following documents are reference to the project. In the current document, these documents are referenced as listed below.

[RD01] Google Web Tool Kit 2.5.1 Developer’s Guide
[RD02] JavaScript Reference from the Mozilla Developer Network
[RD03] ECMA-262 3rd edition
[RD04] HTML5 W3C Working Draft 29 March 2012
http://www.w3.org/TR/2012/WD-html5-20120329/
[RD05] Cascading Style Sheets Level 2 Revision 1 Specification W3C Recommendation 07 June 2011
http://www.w3.org/TR/CSS2/
[RD06] OpenSearch Specification 1.1 Draft 5
http://www.opensearch.org/Specifications/OpenSearch/1.1
[RD07] ETS for OGC 07-118
http://portal.opengeospatial.org/?m=projects&a=view&project_id=309
3. TERMS, DEFINITIONS AND ABBREVIATED TERMS

3.1 Terms

3.2 Definition

<table>
<thead>
<tr>
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<th>Definition</th>
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<tr>
<td>AJAX</td>
<td>Group of interrelated web development techniques used on the client-side to create asynchronous web applications. With Ajax, web applications can send data to, and retrieve data from, a server asynchronously (in the background) without interfering with the display and behaviour of the existing page.</td>
</tr>
<tr>
<td>GWT</td>
<td>Open Source set of tools that allows web developers to create and maintain complex JavaScript front-end applications in Java. Other than a few native libraries, everything is Java source that can be built on any supported platform. GWT is licensed under the Apache License version 2.0.</td>
</tr>
<tr>
<td>JavaScript</td>
<td>Interpreted computer programming language implemented as part of web browsers so that client-side scripts could interact with the user, control the browser, communicate asynchronously, and alter the document content that was displayed.</td>
</tr>
<tr>
<td>OpenSearch</td>
<td>OpenSearch is a collection of technologies that allow publishing of search results in a format suitable for syndication and aggregation. It is a way for websites and search engines to publish search results in a standard and accessible format.</td>
</tr>
<tr>
<td>Servlet</td>
<td>Java programming language class used to extend the capabilities of a server. Although servlets can respond to any types of requests, they are commonly used to extend the applications hosted by web servers.</td>
</tr>
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</table>
### 3.3 Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
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<tr>
<td>AJAX</td>
<td>Asynchronous JavaScript and XML</td>
</tr>
<tr>
<td>ATS</td>
<td>Abstract Test Suite</td>
</tr>
<tr>
<td>CITE</td>
<td>Compliance and Interoperability Testing and Evaluation</td>
</tr>
<tr>
<td>CSS</td>
<td>Cascading Style Sheets</td>
</tr>
<tr>
<td>CTL</td>
<td>Conformance Test Language</td>
</tr>
<tr>
<td>DAIL</td>
<td>Data Access Integration Layer</td>
</tr>
<tr>
<td>EO</td>
<td>Earth Observation</td>
</tr>
<tr>
<td>ESA</td>
<td>European Space Agency</td>
</tr>
<tr>
<td>ETS</td>
<td>Executable Test Suite</td>
</tr>
<tr>
<td>GWT</td>
<td>Google Web Toolkit</td>
</tr>
<tr>
<td>HMA</td>
<td>Heterogeneous Missions Accessibility</td>
</tr>
<tr>
<td>HMA-FO</td>
<td>HMA Follow-On</td>
</tr>
<tr>
<td>HMA-I</td>
<td>HMA-Interoperability</td>
</tr>
<tr>
<td>HMA-S</td>
<td>HMA for Science</td>
</tr>
<tr>
<td>HTTP</td>
<td>HyperText Transport Protocol</td>
</tr>
<tr>
<td>HTTPS</td>
<td>HTTP Secure</td>
</tr>
<tr>
<td>HTML</td>
<td>Hypertext Mark-up Language</td>
</tr>
<tr>
<td>ICD</td>
<td>Interface Control Document</td>
</tr>
<tr>
<td>JEE</td>
<td>Java Enterprise Edition</td>
</tr>
<tr>
<td>JS</td>
<td>JavaScript</td>
</tr>
<tr>
<td>OGC</td>
<td>Open Geospatial Consortium</td>
</tr>
<tr>
<td>RSS</td>
<td>Really Simple Syndication</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
</tr>
<tr>
<td>VM</td>
<td>Virtual Machine</td>
</tr>
<tr>
<td>WAR</td>
<td>Web application Archive</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Mark-up Language</td>
</tr>
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</table>
4. DEMONSTRATOR ARCHITECTURE

4.1 Component Types

The figure below shows the Component Types and their interfaces as used in the EO Satellite OpenSearch Tasking Service Demonstrator of HMA-S. The following conventions are used in the diagram below:

- Components Ey: identify external components not part of the downloadable HMA-S software.
- Components Hx.y: identify HMA-S Demonstrator components which are the output of HMA-S Task x.

![Diagram showing Component Types and Interfaces]

The EO Satellite OpenSearch Feasibility Service Demonstrator of HMA-S complies with the revised OpenSearch Extension for EO Satellite Tasking [AD06] and a subset of the OGC 13-026 [AD04] and OGC 10-032 [AD05] interfaces defined by HMA-S. These interfaces are shown as IF-HMAS-OpenSearch-Description and IF-HMAS-OpenSearch-Search in the figure above. The Demonstrator is based on the components described in the following subsections:

4.1.1 EOSatellite OpenSearch Feasibility Client

This component allows a user to search for feasibility compliant with the protocol IF-HMAS-EOS-EO-T [AD06] with the objective to obtain feasibility result metadata records. The demonstrator is an open-source client which:

- Share source code with Task 4 Catalog client,
- Composed by a Web Client, a Web and Applications Server based on JEE.

The implementation of the demonstrator is based on the Google Web Toolkit 2.5.1, this solution allow to implement reliable AJAX applications. This system is supported by the Java application server Apache Tomcat 7.0.42.
4.1.2 EOSatellite OpenSearch Feasibility Server

This component is a feasibility server based on the ESA EO-CFI Mission libraries Version 4.5 and which exposed an interface compliant to the protocol IF-HMAS-EOS-EO-T [AD06]. This server is implemented in JEE via a Web Application hosted on the Java web application server Apache Tomcat.

The role of the Feasibility Server is to compute feasibility analysis for a given satellite and request parameters.

Part of the Feasibility Server used for the demonstrator is the same used on the DREAM project.

The demonstrator of the OpenSearch extension for EO satellite tasking [AD06] modifies the Multi Mission Feasibility Analysis Server from the DREAM project (see above).
Figure 4 Components Diagram of the Feasibility Server
4.1.3 Component Type to Software mapping

In the context of HMA-S, this software package can be found, as open-source software, on the RSS Portal “Join and Share Area” (http://wiki.services.eoportal.org see Task 7), by following the “Open Software” link identified under “Earth Observation Satellite OpenSearch Tasking Demonstrator”. Both Feasibility client is available on the web site http://code.google.com/p/opensearch-earth-observation-products-system/ and the server on http://code.google.com/p/opensearch-sensor-feasibility-system/

The following table provides summary information on these software packages.

<table>
<thead>
<tr>
<th>Software Package</th>
<th>Version</th>
<th>Component Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>DemonstratorClient.war</td>
<td>1.0</td>
<td>Web Client and Server</td>
<td>Web client to request the catalog, order and product repository server (also called web server)</td>
</tr>
<tr>
<td>HMAS-FAS-1.0-SNAPSHOT.war</td>
<td>1.0</td>
<td>Feasibility Server</td>
<td>Feasibility server</td>
</tr>
</tbody>
</table>

Table 1 Component Type to Software mapping

The demonstrators can be built from the source code by downloading the project for Eclipse for the client and NetBeans for the server. Note that Eclipse Indigo and GWT 2.5.1 are required for the client and NetBeans 7 for the server.

4.2 Interfaces

4.2.1 IF-HMAS-OpenSearch-Description

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Description Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference to specification</td>
<td>OGC 13-039 OpenSearch Extension for EO Satellite Tasking, [AD06]</td>
</tr>
<tr>
<td>Standard reference</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>This interface return the decription of the search service</td>
</tr>
<tr>
<td>Format</td>
<td>Response: XML</td>
</tr>
<tr>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td>.</td>
</tr>
</tbody>
</table>

Table 2 IF-HMAS-OpenSearch-Description

4.2.2 IF-HMAS-OpenSearch-Search

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Search Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference to specification</td>
<td>OGC 13-039 OpenSearch Extension for EO Satellite Tasking, [AD06]</td>
</tr>
<tr>
<td>Standard reference</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>This interface return the search results</td>
</tr>
</tbody>
</table>
| Format | Request: KVP (GET)  
| | Response: XML |
| Purpose |          |
| Comment | .          |

Table 3 IF-HMAS-OpenSearch-Search

4.3 Persistent HMA-S Testbed

The Demonstrator components described in the current document can be downloaded individually by an interested user:

- Downloadlinks are also on the ESA HMA-S wiki page for the Task 7 (https://wiki.services.eoportal.org/tiki-index.php?page=HMA-S+Task+7),
- On the dedicated Google Code project (http://code.google.com/p/opensearch-sensor-feasibility-system/),
- Can be accessed on-line as they are part of the persistent Testbed at ESRIN.
The addresses where the components are accessible are included below:

TBD: all URLs below to be updated and have common base URL as installed on a single Virtual Machine to be redeployed at ESA.

<table>
<thead>
<tr>
<th>ID</th>
<th>Service</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Web Client</td>
<td><a href="http://localhost:8080/DemonstratorClient">http://localhost:8080/DemonstratorClient</a></td>
</tr>
<tr>
<td>7.2</td>
<td>Feasibility Server</td>
<td><a href="http://localhost:8080/HMAS-FAS-1.0-SNAPSHOT">http://localhost:8080/HMAS-FAS-1.0-SNAPSHOT</a></td>
</tr>
</tbody>
</table>

Table 4 Persistent HMA-S Testbed URL per Service

5. SOFTWARE INSTALLATION MANUAL

The purpose of the present section is to provide references to provide installation and configuration information for the different software packages that implement the architecture described the previous chapter.

These packages can be installed on a physical or virtual physical.

Different annexes are available at the end of this document for:
- Annexe A, sizing required for the whole architecture,
- Annexe B, create and set the Virtual Machine,
- Annexe C, installation and configuration of the Operating System,
- Annexe D, COTS installation.

5.1 EOSatellite OpenSearch Feasibility Client

This installation procedure describes how to install the Earth Observation Satellite Tasking Web Client.

5.1.1 Prerequisites

Before starting the installation, the following prerequisites must be satisfied:

- A machine with CentOS 6.3 (64-bit),
- Root password to log in the machine,
- Java Development Kit (JDK) version 7.x (64-bit)
  - JDK version 7 Update 45 is recommended
  - Installed in \opt\java
- Apache Tomcat version 7.x
  - apache-tomcat-7.0.42 is recommended
  - Installed in \srv
- The web client Web application Archive file (file DemonstratorClient.war more information on download link can be found at 4.3 )

N.B. : Don’t forget to set the environment variables for java(%JAVA_HOME%) and tomcat(%CATALINA_HOME%)
5.1.2 Installation
First open a session via SSH to the Linux machine under the root account.

5.1.2.1 Compilation
No compilation of the client is required.

5.1.2.2 Deployment
As root on the Linux machine, copy “DemonstratorClient.war” file to the directory `$CATALINA_HOME/webapps/`
Set tomcat as user and group owner for the file `$CATALINA_HOME/webapps/DemonstratorClient.war`
Start Tomcat.

5.1.2.3 Configuration
No configuration for the Tasking Web Client is required.

5.1.3 Installation Testing
After finishing the steps above, on a client machine open a web browser. Open the following URL `http://WEB_CLIENT_SERVER_IP:WEB_CLIENT_SERVER_PORT/DemonstratorClient` through the web browser. If the installation is successful the main page below is displayed:

Figure 5 Successful Installation of Demonstrator Web CI
5.2 EOSatellite OpenSearch Feasibility Server

This installation procedure describes how to install the Earth Observation Satellite Tasking Feasibility Server.

5.2.1 Prerequisites

Before starting the installation, the following prerequisites must be satisfied:

- A machine with CentOS 6.3 (64-bit),
- Root password to log in the machine,
- Java Development Kit (JDK) version 7 (64-bit)
  
  JDK version 7 Update 45 is recommended
  
  Installed in \opt\java
- Apache Tomcat version 7.x
  
  apache-tomcat-7.0.42 is recommended
  
  Installed in \srv\tomcat
- The web client Web application Archive file (file DemonstratorClient.war), located and available from the svn at the address:
  
  https://opensearch-sensor-feasibility-system.googlecode.com/svn/target/HMAS-FAS-1.0-SNAPSHOT
- The source code of the application is located on the svn repository:
  
  http://opensearch-sensor-feasibility-system.googlecode.com/svn/
- The Earth Observation Mission CFI Software Version 4.6 from the site
  
  http://eop-cfi.esa.int/index.php/mission-cfi-software/eocfi-software/branch-4-x/eocfi-v4x-download
  (registration is required). Files are in: EOCFI-4.6-JAVALIB-LINUX64.zip or EOCFI-4.6-JAVALIB-WINDOWS.zip (depending on platform).

  To install them:

  o Copy all the files from the “libraries” folder to /usr/lib (or anything that is on the java.library.path),
  o Copy all the files from the “cfi_tools” folder to $CATALINA_HOME/bin (needed for windows only),
  o The JNI part of the EOCFI (jar files) is already included in the HMAS-FAS-1.0-SNAPSHOT.war file.

5.2.2 Installation

First open a session via SSH to the Linux machine under the root account.

5.2.2.1 Compilation

No compilation of the server is required.

5.2.2.2 Deployment

As root on the Linux machine, copy “HMAS-FAS-1.0-SNAPSHOT.war” file to the directory $CATALINA_HOME/webapps/

Update the permissions (add tomcat user and group as owner) and rights (7 for the tomcat user and group and execution for everyone) of the directory $CATALINA_HOME/shared/lib and on the file $CATALINA_HOME/webapps/HMAS-FAS-1.0-SNAPSHOT.war
Update $CATALINA_HOME/bin/setenv.sh with the following information

```sh
#!/bin/sh
export LD_LIBRARY_PATH=$CATALINA_HOME/shared/lib
export JAVA_OPTS=-Djava.library.path=$CATALINA_HOME/shared/lib
export CATALINA_OPTS=-Djava.library.path=$CATALINA_HOME/shared/lib
```

Start Apache Tomcat.

### 5.2.2.3 Configuration

The ".dream" configuration folder in the ".dream.zip" file. Unzip it in your %USER_HOME%. This contains all the properties of Sentinel 1 + the files needed by the EOCFI to perform Feasibility Analysis.

### 5.2.3 Installation Testing

After finishing the steps above, on a client machine open a web browser. Open the following URL http://WEB_CLIENT_SERVER_IP:WEB_CLIENT_SERVER_PORT/ DemonstratorClient through the web browser. If the installation is successful the main page below is displayed:

![Figure 6 Successful Installation of Demonstrator Web CI & Feasibility Server](image)

Click on the left side of the interface. Add the following URL http://FEASIBILITY_SERVER_IP:FEASIBILITY_SERVER_PORT/ HMAS-FAS-1.0-SNAPSHOT in the form and click on the button “Submit”. The search form is built following the OpenSearch description result. The OpenSearch description document can be downloaded at the URLs:

http://FEASIBILITY_SERVER_IP:FEASIBILITY_SERVER_PORT/ HMAS-FAS-1.0-SNAPSHOT/hmas/fas/os/description

and

http://FEASIBILITY_SERVER_IP:FEASIBILITY_SERVER_PORT/ HMAS-FAS-1.0-SNAPSHOT/
6. USER MANUAL

The demonstrator is based on a web application, all the functionalities are organised around the map.

Web browser supported is Chrome version 34 and above.

With a web browser open the web client URL.
Click on the tab “Tasking Feasibility” and on “Search”, in the field copy the address of the Tasking Open Search description document.

The OpenSearch Description Document of the Tasking Service looks like:

```
<url>
   http://demosatellite.nasa.gov/demosatellite/services/TaskingSearch/describe</url>
<name>Tasking</name>
<shortname>Tasking</shortname>
<description>This search engine permits to retrieve feasibility results for EO satellites.</description>
<contentLocation>http://demosatellite.nasa.gov/demosatellite/services/TaskingSearch/Tasking</contentLocation>
<protocol>http</protocol>
<extension>cs</extension>
```

Figure 7 HMA-S Demonstrator Web Client, Main page

Figure 8 HMA-S Demonstrator Web Client, OpenSearch Description Document
Click on the button “Send” to load the content of the Description Document and set the GUI following the services parameters.

![Figure 9 HMA-S Demonstrator Web Client, Load OpenSearch Description Document](image)

The GUI is built following the Description Document, create the AOI, and click on the button “Draw AOI”.

![Figure 10 HMA-S Demonstrator Web Client, Start draw AOI](image)

On the map define the AOI, the coordinates will appear in the fields “Area of Interest”.

Define the period (begin and end dates) for “Acquisition Date”.

Select the “Platform” in the list.
Select the “Instrument” in the list.

Following the OpenSearch Description document parameters can be set for “Acquisition Parameters”.

Figure 13 HMA-S Demonstrator Web Client, Platform Selection

Figure 14 HMA-S Demonstrator Web Client, Instrument Selection
Following the OpenSearch Description document parameters can be set for “Validation Parameters”.

Click on the button “Send request”.

Figure 15 HMA-S Demonstrator Web Client, Acquisition Parameters

Figure 16 HMA-S Demonstrator Web Client, Validation Parameters
The EO-CFI processing steps are displayed on the Tomcat output of the Feasibility Analysis Server.

The result is displayed in the tab “Results”, the segments on the map and XML document in the Tomcat output.
Reduce the map zoom level to get the full view of the result segments.

Click on the tab “Details” to get the detail of the result.
Figure 21 HMA-S Demonstrator Web Client, Tasking result detail
7. ANNEXE A: SIZING REQUIREMENTS

The sizing requirements are not linked to the type of the machine (physical or virtual), these requirements are the same for both types.

Sizing requirements are defined by:
- CPU, frequency in GHz and quantity of Core per CPU,
- Memory, amount in GB,
- Hard drive, size in GB.

7.1 Web Client Machine Requirements

The Web Client machine has low sizing requirements.

<table>
<thead>
<tr>
<th>CPU</th>
<th>Memory (GB)</th>
<th>Hard Drive (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (GHz)</td>
<td>Quantity of Core per CPU</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>1</td>
<td>None, the demonstrator doesn’t store any data on the client</td>
</tr>
</tbody>
</table>

Table 5 Sizing Requirements for the Web Client Machine

7.2 Web and Applications Servers Requirements

The Web and Applications Server sizing requirements are:

<table>
<thead>
<tr>
<th>CPU</th>
<th>Memory (GB)</th>
<th>Hard Drive (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (GHz)</td>
<td>Quantity of Core per CPU</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 6 Sizing Requirements for the Applications Server Machine
8. ANNEXE B: CREATE AND SET THE VIRTUAL MACHINE

This procedure is based on VMware Player version 5.0.2 build-1031769. This software can be downloaded at: http://www.vmware.com/products/player/

Start the VMware Player, click on “Create a New Virtual Machine”.

Figure 22 VMware Player Create a New Virtual Machine
Select the option “I will install the operating system later.”

Figure 23 VMware Player Create a New Virtual Machine, OS install method

Select “CentOS 64-bit” as guest Operating System list.

Figure 24 VMware Player Create a New Virtual Machine, Guest OS selection
For each of the boxes set the name of the Virtual Machine.

Figure 25 VMware Player Create a New Virtual Machine, Virtual Machine name

Set the disk size following the Annexe A table, select the option “Split virtual disk into multiple files”.

Figure 26 VMware Player Create a New Virtual Machine, Disk Capacity
Click on the button “Customize Hardware…”.

![Customize Hardware](image)

Figure 27 VMware Player Create a New Virtual Machine, Customize Hardware

Set the memory amount following the Annexe A table,

![Set memory amount](image)

Figure 28 VMware Player Create a New Virtual Machine, Set memory amount
Set the quantity of core per CPU following the Annexe A table,

![Figure 29 VMware Player Create a New Virtual Machine, Quantity of core per CPU](image-url)
Set the Network connection to “Bridged: Connected directly to the physical network” and select “Replicate physical network connection state”.

Remove each of the devices below (selects the device and click on the button “Remove”):
- Floppy,
- Sound Card,
- Printer.

Click on the button “Close”.

Figure 30 VMware Player Create a New Virtual Machine, Network Connection
At the end of the creation of the Virtual Machine click on the button “Finish”.

Figure 31 VMware Player Create a New Virtual Machine, End of creation

The new Virtual Machine is listed in the VMware Player main interface.

Figure 32 VMware Player Create a New Virtual Machine, List of Virtual Machine
9. ANNEXE C: INSTALLATION AND CONFIGURATION OF THE OPERATING SYSTEM

Download the CentOS 6.3 64-bits iso minimal version from the CentOS web site (http://www.centos.org).

Select the Virtua Machine, click on the button “Edit virtual machine settings”.

![Figure 33 Installation of the Operation System, VMware Player](image)
Click on the device “CD/DVD” and click on the button “Browse” to select the iso of the OS.

Figure 34 Installation of the Operation System, Select ISO of the OS

Start the Virtual Machine, click on the button “Next”.

Figure 35 Installation of the Operation System, Virtual Machine start
Select the language in the list, click on the button “Next”.

Figure 36 Installation of the Operation System, language selection

Select the keyboard layout in the list, click on the button “Next”.

Figure 37 Installation of the Operation System, keyboard layout selection
Select “Basic Storage Devices” for the device type, click on the button “Next”.

![Figure 38 Installation of the Operation System, Storage device type](image)

Select “Yes, discard any data”, click on the button “Next”.

![Figure 39 Installation of the Operation System, Storage Device Warning](image)
Set the hostname of the Virtual Machine, click on the button “Next”.

![Figure 40: Installation of the Operation System, Hostname](image)

Set the time zone, click on the button “Next”.

![Figure 41: Installation of the Operation System, Time Zone](image)
Set the root password, click on the button "Next".

![Figure 42 Installation of the Operation System, Set root password](image)

Set the installation type, click on the button “Next”.

![Figure 43 Installation of the Operation System, Installation Type](image)
Write the storage configuration to the disk by clicking on “Write changes to disk”, click on the button “Next”.

![Image](image.png)

**Figure 44 Installation of the Operation System, Write changes to disk**

Wait during the installation of the OS.
At the end of the installation click on the button “Reboot”.

Congratulations, your CentOS installation is complete.
Please reboot to use the installed system. Note that updates may be available to ensure the proper functioning of your system and installation of these updates is recommended after the reboot.
ANNEXE D: COTS INSTALLATION

9.1 JDK

The JDK must be installed on all the Virtual Machines.
From the Sun Oracle web site (http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html) download the JDK version 7 update 45 for Linux 64-bits.
The file is named: jdk-7u45-linux-x64.bin

Create directory

# mkdir -p /usr/java

Move to directory

# cd /usr/java

Change the rights

# chmod 700 /tmp/jdk-7u45-linux-x64.bin

Execute the installation binary

# /tmp/jdk-7u45-linux-x64.bin
...creating: jdk1.7.0_45/
creating: jdk1.7.0_45/db/
creating: jdk1.7.0_45/db/bin/
inflating: jdk1.7.0_45/db/bin/ij
inflating: jdk1.7.0_45/db/bin/NetworkServerControl
inflating: jdk1.7.0_45/db/bin/setNetworkClientCP.bat
inflating: jdk1.7.0_45/db/bin/derby_common.sh
...
Done.

Set the environment variable JAVA_HOME

# export JAVA_HOME=/usr/java/jdk1.7.0_45

Add the JAVA_HOME variable to the PATH

# export PATH=$JAVA_HOME/bin:$PATH

Check if java binary is found

# which java
/usr/java/jdk1.7.0_45/bin/java

Check the version of java

# java -version
java version "1.7.0_45"
Java(TM) SE Runtime Environment (build 1.7.0_45-b40)
Java HotSpot(TM) 64-Bit Server VM (build 11.0-b40, mixed mode)
9.2 Tomcat

Tomcat must be installed on all the Virtual Machines. From the Tomcat Apache web site (http://tomcat.apache.org/download-70.cgi) download Tomcat version 7.0.42. The file is named: apache-tomcat-7.0.42.tar.gz

For security reasons create a user account with no login shell for running the Tomcat server:

```bash
# groupadd tomcat
# useradd -g tomcat -s /usr/sbin/nologin -m -d /home/tomcat tomcat
```

Extract the tar.gz file to /srv:

```bash
# cd /srv
# tar zxvf /tmp/apache-tomcat-7.0.42.tar.gz
```

Changed the ownership of all files and directories to tomcat:

```bash
# chown -R tomcat.tomcat /srv/apache-tomcat-7.0.42
```

Check the Tomcat version:

```bash
# /var/lib/apache-tomcat-7.0.42/bin/version.sh
Using CATALINA_BASE: /srv/apache-tomcat-7.0.42
Using CATALINA_HOME: /srv/apache-tomcat-7.0.42
Using CATALINA_TMPDIR: /srv/apache-tomcat-7.0.42/temp
Using JRE_HOME: /usr/java
Server version: Apache Tomcat/7.0.42
Server built: Jul 22 2009 02:00:36
Server number: 7.0.42.0
OS Name: Linux
OS Version: 2.6.18-6-amd64
Architecture: x86_64
JVM Version: 1.7.45
JVM Vendor: Free Software Foundation, Inc.
```

Start Tomcat:

```bash
# su -p -s /bin/sh tomcat $CATALINA_HOME/bin/startup.sh
Using CATALINA_BASE: /srv/apache-tomcat-7.0.42
Using CATALINA_HOME: /srv/apache-tomcat-7.0.42
Using CATALINA_TMPDIR: /srv/apache-tomcat-7.0.42/temp
Using JRE_HOME: /usr/java/jdk1.7.0_45
```

Stop Tomcat:

```bash
# su -p -s /bin/sh tomcat $CATALINA_HOME/bin/shutdown.sh
Using CATALINA_BASE: /srv/apache-tomcat-7.0.42
Using CATALINA_HOME: /srv/apache-tomcat-7.0.42
Using CATALINA_TMPDIR: /srv/apache-tomcat-7.0.42/temp
Using JRE_HOME: /usr/java/jdk1.7.0_45
```
<END OF THE DOCUMENT>