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## HISTORY OF DOCUMENT CHANGES

Issue	Date	Change Description
Version 1.0	July 26 <sup>th</sup> , 2020	Initial Issue
Version 1.1	July 27 <sup>th</sup> , 2020	Final version

## Table of Contents

1. Introduction.....	4
2. Assessment of virtual access services provided January 1 <sup>st</sup> 2019– June 30 <sup>th</sup> 2020.....	4
2.1 Hinode Science Data Centre Europe (Hinode SDC) .....	4
2.2 Belgian Web Incessant Screening for SDO Mission (BE-WISSDOM) .....	4
2.3 Stockholm SST Archive .....	4
2.4 IBIS Data Archive (IBIS-A) .....	5
2.5 GRIS Data Archive.....	5
3. Suggestions for Improvements .....	5

### List of Abbreviations (if applicable)

IBIS	Interferometric Bidimensional Spectropolarimeter
IRIS	Interface Region Imaging Spectrograph
SDO	Solar Dynamics Observatory
SST	Swedish 1-m Solar Telescope
SVO	Solar Virtual Observatory
VSO	US Virtual Solar Observatory

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## 1. Introduction

This document provides an independent assessment of the virtual access services provided in the SOLARNET project in the period January 1<sup>st</sup>, 2019 to June 30<sup>th</sup>, 2020. The assessment board was appointed by the executive board of SOLARNET on April 29<sup>th</sup>, 2020 and consists of Dr. Neal Hurlburt, Lockheed Martin Solar and Astrophysics Laboratory, Palo Alto, USA and Professor Dr. Louise Harra, Director PMOD/WRC, affiliated Professor at ETH-Zürich, Davos, Switzerland.

The main source of information for the assessment board has been SOLARNET deliverable 10.1, "Statistics of access provided 1", version 1.0 from July 12<sup>th</sup>, 2020 but additional information was also gathered from the access provider links provided in D10.1.

WP10, Virtual Access Programme, provides access to the most demanded European Science Data Centres, providing data gathered by the solar satellites HINODE, IRIS, and the Solar Dynamics Observatory (SDO), as well as ground-based data from GREGOR, IBIS and SST (not previously offered through EC funding). A novelty in this project is the addition of access to numerical simulations, including synthetic observables, to enable close collaboration between observations and theory.

Provision of access is to the following infrastructure(s):

- **Hinode Science Data Centre Europe (Hinode SDC)**, operated by UiO, located in Oslo, Norway
- **Belgian Web Incessant Screening for SDO Mission (BE-WISSDOM)**, operated by ORB, located in Brussels, Belgium
- **Stockholm SST Archive**, operated by SU, located in Stockholm, Sweden
- **IBIS Data Archive (IBIS-A)**, operated by INAF, located in Rome, Italy
- **GRIS Data Archive**, operated by KIS, located in Freiburg im Breisgau, Germany

## 2. Assessment of virtual access services provided January 1<sup>st</sup> 2019– June 30<sup>th</sup> 2020

### 2.1 Hinode Science Data Centre Europe (Hinode SDC)

Operated by UiO, located in Oslo, Norway

This is well established and includes Hinode and IRIS spacecraft data as well as simulations. This is the first solar archive to provide simulations. This feature has proven popular with over 14,000 files downloaded leading to 33 published papers. It is likely to be increasingly popular as the site develops.

### 2.2 Belgian Web Incessant Screening for SDO Mission (BE-WISSDOM)

Operated by ORB, located in Brussels, Belgium

This is one option for accessing and downloading the SDO data. Usage has been significant and steady over the past 18 months with approximately one million hits and 10,000 unique visitors per year. Status of the SVO was not described, but a visit to the website shows they have made good progress.

### 2.3 Stockholm SST Archive

Operated by SU, located in Stockholm, Sweden

Since there is not yet any public data in the archive, there has been no virtual access provided (will commence in period 2). The data will be made available under SVO above.

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## 2.4 IBIS Data Archive (IBIS-A)

Operated by INAF, located in Rome, Italy

This archive is now being used at a low level, which hopefully will increase with time.

## 2.5 GRIS Data Archive

Operated by KIS, located in Freiburg im Breisgau, Germany

Over 20 TB of data is now available on the website. There is a clear plan of how this can be improved.

# 3. Suggestions for Improvements

The access points are across five different websites. It may be good to have one front-end in the future that directs to the different sites. This may be beneficial for extending the community using the data in light of the new communities of Parker Solar Probe and Solar Orbiter now engaged.

Coordinated solar observations and data discovery would benefit from a uniform system for describing the complex modes and datasets generated by modern observing systems and the results of mining the resulting data sets. There are efforts underway in SOLARNET (WP2, deliverable D2.18-D2.21) but there are also efforts underway in the US to standardize such higher-level descriptions which might benefit the SOLARNET project. See recent discussions at NSF EarthCube workshop (<https://www.earthcube.org/EC2020> , <https://youtu.be/GdugriJryrQ> ).

- Hinode SDC – there are plans to include SST and Alma data in the website. Having as many datasets in one place is certainly beneficial.
- BE-WISSDOM – the SDO data centre is well used. The SVO is under development. It isn't clear how this will be different from the existing VSO which is used readily through IDL and SunPy. The web interface seems user-friendly.
- Stockholm SST Archive – the data will be made available under the SVO – but also under Hinode SDC. Is there a plan of how to improve clarity of what is available where – what will be the best source for SST?
- IBIS data archive – what is the plan for improving in the future?