THE LASCO ARTEMIS CME Catalog

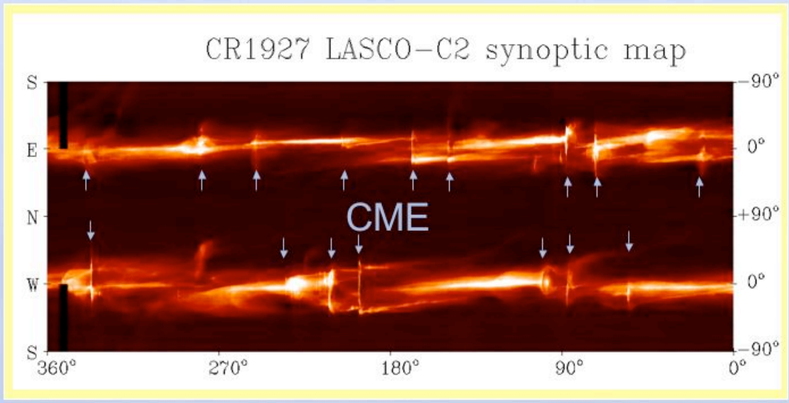
Links to the Virtual Observatory using SITools

F. Ernandes, M. Burtin, T. Fenouillet, L. Fiore, R. Savalle, C. Surace
Laboratoire d'Astrophysique de Marseille, France

Summary

The LASCO-C2 coronagraph aboard the SOHO solar observatory has been providing a continuous flow of coronal images for the past ten years. Synoptic maps have been built from these images and offer a view of the temporal evolution of the solar corona and Coronal Mass Ejections (CMEs).

We present the LASCO-ARTEMIS (Automatic Recognition of Transient Events and Marseille Inventory from Synoptic maps) data base. Data have been released using a new automated method of detection of CMEs based on an adaptive filtering and segmentation. time of appearance, position angle, angular extent and average velocity are released via the SITools environment and their Virtual Observatory SVA (Services à Valeur Ajoutée).



Résumé

Le coronographe LASCO-C2 installé sur le satellite SOHO fournit depuis plus de dix ans un flow continu d'images coronales Des cartes synoptiques ont été construites et offrent une vue de l'évolution temporemme à la fois de la courronne solaire mais aussi des éjections de masses solaires (CMEs)

Dans ce poster nous présentons la base de données LASCO - ARTEMIS (Automatic Recognition of Transient Events and Marseille Inventory from Synoptic maps). Les données ont été traitées en utilisant une nouvelle méthode automatique de détection des CMEs, basée sur un filtrage adaptatif et une segmentation. Date, heure, angle de positionnement, extension angulaire sont les données disponibles sous forme de VOTable en utilisant l'environnement SITools et l'utilisation des Services à Valeur Ajoutée (SVA)

PREVIOUS EXISTING CATALOGS

1 - LASCO CME Catalog (USA) :

http://cdaw.gsfc.nasa.gov/CME_list/

Visual detection and tracking of CMEs on LASCO-C2/C3 images, the catalog is assembled by human operators.

Returned parameters :

Time of appearance, Position angle, Angular extent, Velocity, Acceleration.

2 - CACTus Catalog (Belgium) :

http://sidc.oma.be/cactus/

Fast automated detection based on objective detection criteria.

Returned parameters :

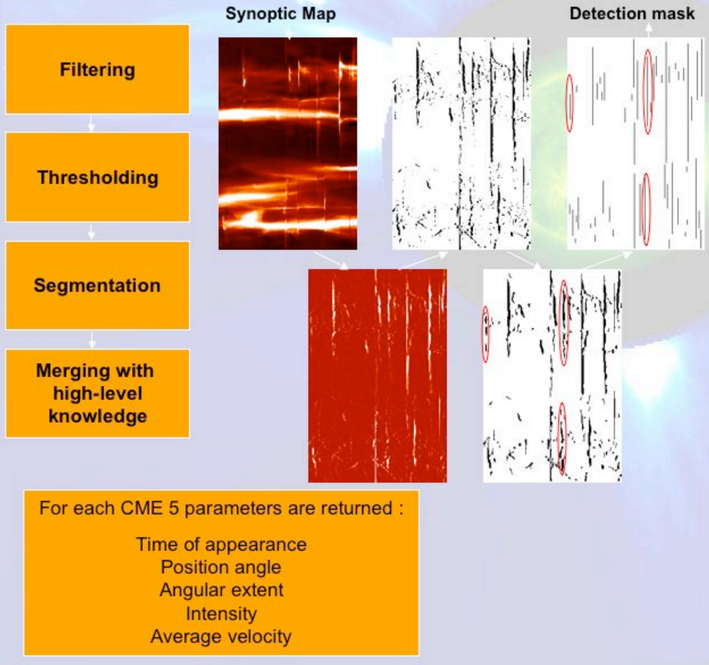
Time of appearance, Duration of liftoff, Position angle, Angular extent, Velocity.

A NEW APPROACH

Use of the Synoptic Maps (instead of images):
- Global vision in time.
- Specific characterization of CMEs is possible.
- Interaction of CMEs with streamers.

An automatic method :
- Detection based on objective criteria.
- Fast detection process.

METHOD



For each CME 5 parameters are returned :

Time of appearance
Position angle
Angular extent
Intensity
Average velocity

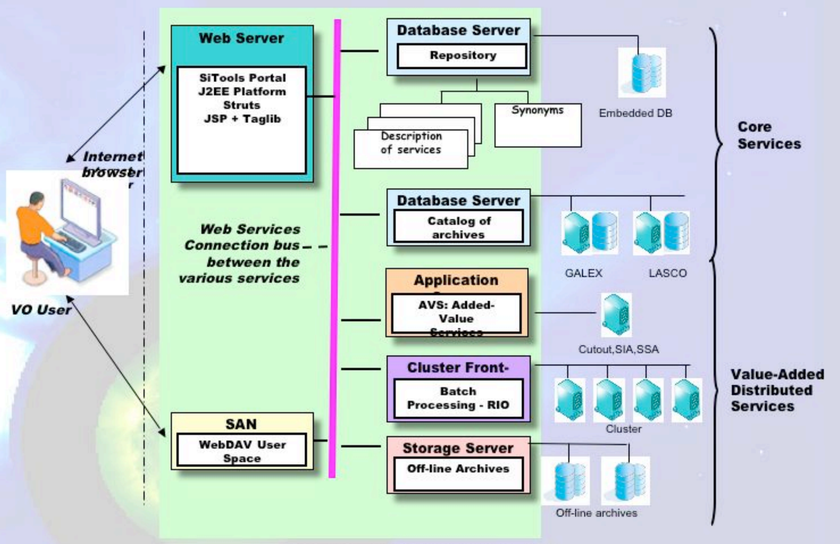
SITools:

Towards a VO - compliant portal for LAM archives

Developed by CNES in partnership with a computing and consulting company, SiTools (Système d'Information, de Préservation et d'Accès aux Données) provides a customizable portal, a powerful query builder and a set of J2EE-compliant tools.

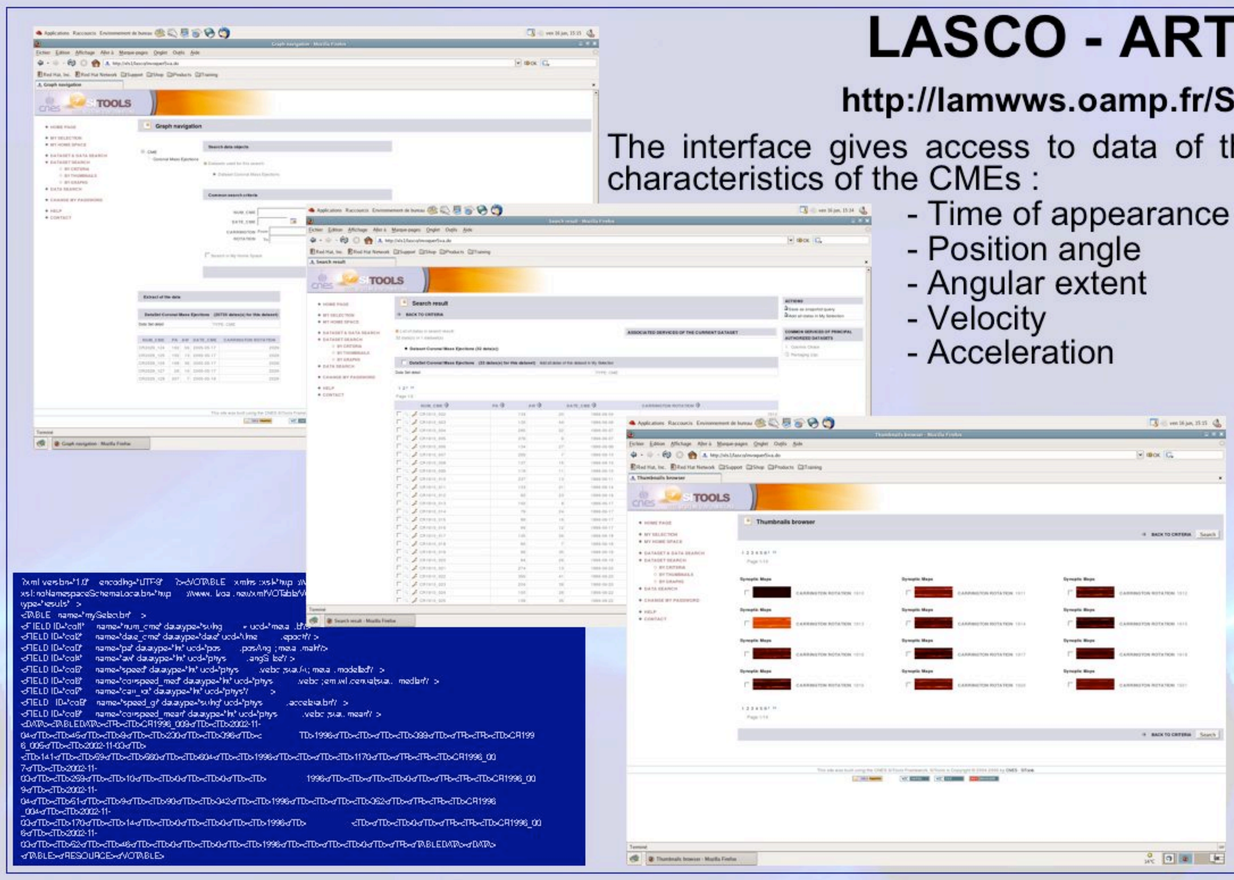
This modular system, which features a virtual Web Service bus, will ease the development of middleware layers enabling interconnection of VO value-added services (SVA) with existing astronomical datasets.

The SVAs modules Will allow connection throughout the Virtual Observatory and data extraction for Web Services analysis.



SiTools Architecture at LAM

http://vds.cnes.fr/sitools/tech.htm



LASCO - ARTEMIS

http://lamwws.oamp.fr/SI/lascocme

The interface gives access to data of the processed images and characteristics of the CMEs :
- Time of appearance
- Position angle
- Angular extent
- Velocity
- Acceleration

Using the SVA modules interfaces, the output data could be available as VOTable formated data

The LASCO ARTEMIS CME data base has been chosen to be part of the experimentation of using SITools as a VO compliant portal to the data bases of the LAM. The accessibility using SVA modules have been checked out and the new CME data will be soon accessible as public data on the LAM site.

Modifications are underway to make the LASCO ARTEMIS able to give added value data with direct acces to CME Characteristics

-Publication list

•LASCO: Brueckner, G. E. et al, 1995, Solar Physics, v. 162, p. 357-402
•Boursier, Y.; Llebaria, A.; Goudail, F.; Lamy, P.; Robelus, S.Automatic Detection of Coronal Mass Ejections on LASCO-C2 Synoptic Maps.2005, Proc. SPIE, Vol. 5901 - 02-
•Yannick Boursier; Philippe Lamy; Antoine Llebaria; Sébastien Robelus;The Marseille-Artemis Catalog of LASCO CMEs; 2006, Proc. SOHO 17, in press
•Levoir T., Harvey C.C., Thieman J.R., Bell E.V., Huc C, "SPASE prototype : an example application for the interoperability in Space Physics",American Geophysical Union (AGU) Fall Meeting, San Francisco (USA), 8-12 December 2003