



STEREO SWG, Fall Hills, Meredith, NH

- STEREO/WAVES team status
- STEREO/WAVES studies in progress
- Instrument status report



STEREO/WAVES team status

68 members:

- 30 S/WAVES Co-Investigators
- 2 S/WAVES Co-I Emeritus
- 3 S/WAVES science team members
- 33 S/WAVES Associate and Participating scientists



Member's field of interest:

STEREO/WAVES team status

STEREO/WAVES science team and topics (v9d)

Main phase of scientific analysis

68 members

NASA official investigators (30)

PI, Co-PI:

Jean-Louis Bougerol (LESIA, Observatory of Paris)

Mike Kaiser (NASA/BSFC)

Kath Goetz (University of Minnesota)

Co-PI:

Co-Investigator - Stuart Bale (SSL, University of California, Berkeley) acts as the main liaison with the IMPACT team. He will be responsible for planning coordinated observations between SWAVES and IMPACT, and for linking remote sensing detection of travelling radio disturbances to in situ observations.

Co-Investigator - Corine Briand (LESIA, Observatory of Paris) is responsible for the Meudon efforts in micro-physics studies, in particular using the waveforms obtained by the TDS receiver, from both data analysis and simulation perspectives. She is responsible of the TDS data archiving at the French CNRS SIGNE S Data Center (CDPP). She is also active in the public outreach program and in creating possibilities for participation of students in the SWAVES research, and is responsible of the French EIPD.

Co-Investigator - Ivar Cairns (University of Sydney) is involved in developing and applying theories and numerical simulations to aid interpretation and analysis of observations.

Co-Investigator - Cindy Colwell (University of Minnesota) examines dispersion mechanisms associated with interplanetary shocks and acceleration in association with ICMEs. She is also coordinating the UM EPO effort, including such activities as adopting 3d visualization work we have done for Cluster to STEREO applications and working with the UM School of Education.

Co-Investigator - Depaula Cecconi (LESIA, Observatory of Paris) is responsible for the development of the direction finding algorithms and their implementation for the STEREO science. He investigates the radiation pattern of radio sources observed by SWAVES (AKR, solar interplanetary bursts). He is responsible of the data archiving for the French contribution; he interfaces with the French CNRS SIGNE S Data Center (CDPP).

Co-Investigator - Bob Ergun (University of Colorado) participates in the interpretation and modeling of the observations.

Co-Investigator - Joe Fainberg (NASA/BSFC) has made extensive contributions to the radio physics of the interplanetary medium, including the use of stereoscopic techniques. He participates in the interpretation and modeling of the observations.

Co-Investigator - Nat Goswami (NASA/BSFC) has developed and is maintaining visualization tools for comparing SWAVES spectra with SECCHI images. He is extending to the STEREO measurements his research into CME interaction, and studies such topics as slowdown of CMEs, efficiency of particle acceleration (electrons and ions) by CME-driven shocks, both in the case of interacting CMEs, and the complex interplanetary CMEs resulting from interacting CMEs. He will apply to STEREO his research in identifying CMEs that will have significant space weather effects.

Co-Investigator - Song Huang (LESIA, Observatory of Paris) provides support to the direction finding technique, in relation with results from Wind radio data. He participates in the study and modeling of propagation effects in the interplanetary medium. He is involved in developing and applying multi-site tracking technique to the study of

interplanetary radio emissions, in connection with the Wind Waves Instrument and in light of results from Wind-Ulysses simultaneous radio observations.

Co-Investigator - Russ Howard (Naval Research Laboratory), the SECCHI Principal Investigator, acts as liaison between the SECCHI Investigation and the STEREO/WAVES Investigation; he participates in common science analysis as well as in the development of common data displays for both radio and optical observations.

Co-Investigator - Karine Isenauer (LESIA, Observatory of Paris) works on the scientific data analysis of the SWAVES ILFR receiver, more precisely on the utilization of the quasi-thermal thermal noise diagnostics to determine the electron parameters in the core of magnetic clouds. She is involved in the data distribution and archiving of electron plasma parameters.

Co-Investigator - Paul Kellogg (University of Minnesota) provides scientific direction and is responsible for the portion of the experiment hardware and software provided by the University of Minnesota. He will in particular be responsible for testing and calibration of the experiment hardware related to the fast sampler (TDS) and the low rate science system; participate in the conception and development of preflight test and calibration procedures and in the design of the preflight test equipment of the STEREO/WAVES instrument; participate in analysis of data from the entire experiment, with emphasis in situ studies.

Co-Investigator - Alan Kerdraon (LESIA, Observatory of Paris) is responsible for the co-ordination with the Nancy radio Heliograph during the duration of the STEREO Mission. He participates to the interpretation and modeling of the observations.

Co-Investigator - Sam Krucker (SSL, University of California, Berkeley) is involved in STEREO/WAVES software development, data analysis, and scientific interpretation. He combines STEREO/WAVES data with (1) in-situ particle observations from WIND, ACE, SOHO, and STEREO, (2) radio observations at higher frequencies from various ground based telescopes, and (3) solar imaging observations at various wavelengths in particular in the X-ray range (RHESSI).

Co-Investigator - Alain Lecacheux (LESIA, Observatory of Paris) provides observing ground support at decimeter wavelength from the Nancy Decimeter Array; participates in the application of the direction finding technique, in particular regarding detection and analysis of planetary (the Earth, Jupiter, Saturn) and galactic radio emissions at low frequencies; participates to the interpretation and modeling of radio observations.

Co-Investigator - Bob Lin (SSL, University of California, Berkeley) participates in common observations of travelling disturbances by IMPACT and SWAVES.

Co-Investigator - Jen Luhmann (SSL, University of California, Berkeley), the IMPACT Principal Investigator, acts as liaison between the IMPACT Investigation and the STEREO/WAVES Investigation; she participates in common science analysis as well as in the development of common data analysis schemes for both radio and in situ plasma observations.

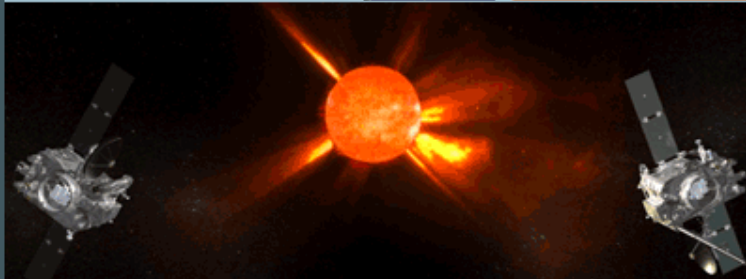
Co-Investigator - Bob MacDowell (NASA/BSFC) is responsible for the Education and Public Outreach section of the STEREO/WAVES proposal, and will co-ordinate all EPO activities. He participates to the interpretation and modeling of the observations.

Co-Investigator - Milan Makićević (LESIA, Observatory of Paris) provides overall support for SWAVES and in particular support for the LFR and HFR calibrations. He participates in the application of the direction finding and in the development of propagation models of radio waves in the interplanetary medium.

Co-Investigator - Antonios Moysidou (University of Athens) provides science support together with the ancillary data from the ARTEMIS ground-based project (very high time and frequency resolution from decimeter to decimeter wavelengths). He is studying the fine structure of radio bursts and pulsations, as well as the onset and evolution of the events, in conjunction with other instruments (ground-based and space-borne).

Co-Investigator - Mike Reimer (Raytheon ITS S at BSFC) assists the U.S. Lead Co-Investigator in the interpretation and modeling of the observations, particularly those activities relating to Space Weather.

Co-Investigator - Peter Robinson (University of Sydney) is involved in developing and applying theories and numerical simulations to aid interpretation and analysis of observations, and their space-weather implications.



STEREO/WAVES

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Publications

Ci-dessous la liste des articles décrivant l'instrument ou utilisant les données de S/WAVES. La liste complète des articles concernant STEREO est disponible [ici](#).

Reuves à comité de lecture/Refereed Articles

2009

St. Cyr, O. C., Kaiser, M. L., Meyer-Vernet, N., Howard, R. A., Harrison, R. A. et al., *STEREO SECCHI and S/WAVES Observations of Spacecraft Debris Caused by Micron-Size Interplanetary Dust Impacts*, 2009, Solar Physics, Volume 256, Issue 1-2, pp. 475-488

Meyer-Vernet, N., Maksimovic, M., Czechowski, A., Mann, I., Zouganelis, I. et al., *Dust Detection by the Wave Instrument on STEREO : Nanoparticles Picked up by the Solar Wind ?*, 2009, Solar Physics, Volume 256, Issue 1-2, pp. 463-474

Henri, P., Briand, C., Mangeney, A., Bale, S. D., Califano, F. et al. *Evidence for wave coupling in type III emissions*, 2009, Journal of Geophysical Research, Volume 114, Issue A3, CiteID A03103

Panchenko, M., Khodachenko, M. L., Kislyakov, A. G., Rucker, H. O., Hanasz, J. et al., *Daily variations of auroral kilometric radiation observed by STEREO*, 2009, Geophysical Research Letters, Volume 36, Issue 6, CiteID L06102

Kellogg, P. J., Goetz, K., Monson, S. J., Bale, S. D., Reiner, M. J. et al., *Plasma wave measurements with STEREO S/WAVES : Calibration, potential model, and preliminary results*, 2009, Journal of Geophysical Research, Volume 114, Issue A2, CiteID A02107

2008

Cattell C., Wygant J. R., Goetz K., Kersten K., Kellogg P. J. et al., " *Discovery of very large amplitude whistler-mode waves in Earth's radiation belts*", 2008, Geophysical Research Letters, Volume 35, Issue 1 , [on line](#)

J.L. Bougeret, K. Goetz, M.L. Kaiser, S.D. Bale, P.J. Kellog et al., "*S/WAVES : the Radio and Plasma Wave Investigation on the STEREO mission*", 2008, Space Science Review, DOI :



STEREO/WAVES studies in progress

We “adjusted” to extended solar minimum!

- Still, work on few radio events!
- more time for calibrations, refining direction finding techniques
- more time for theoretical work
- focus on *in situ* studies (wave form analyzer: wave coupling, dust)
- radio emission from magnetospheres (Earth, Jupiter)



STEREO/WAVES studies in progress

On-going work on radio events and observations:

- comprehensive analysis of a type III radio storm (Eastwood)
- beam pattern characterization (Bonnin)
- association of IP type III radio emission with CMEs, EUV waves and large scale coronal structures (Kerdran)
- modeling of galactic radio background at LF using data from Ulysses, Cassini and STEREO (Lecacheux, MacDowall, Hoang)
- magnetic field topology of the inner heliosphere from combined observations of S/WAVES, IMPACT and RHESSI (Martinez-Oliveros)
- Multiwavelength analysis of the 19 May 2007 SEP event (Kerdran)
- Radio signatures of EUV waves (Pick)



STEREO/WAVES studies in progress

Calibrations, direction finding, search algorithms, theory:

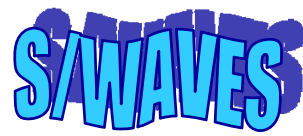
- direction finding algorithms, source sizes, ray tracing simulations (Cecconi, Reiner, Lecacheux, Rucker, Santolik, Kasper, ...)
- development of Wind-Ulysses radio tracking of CME driven shocks in preparation to STEREO (Hoang)
- Monte-Carlo modeling of radio wave propagation in the corona and solar wind (Golla, MacDowall)
- automated algorithm for identification of transients seen by both spacecraft (Kasper)
- characterization of the propagation of CME shocks (Cremades, Reiner)
- Non-linear plasma turbulence: Type III solar radio burst simulations (Robinson)



STEREO/WAVES studies in progress

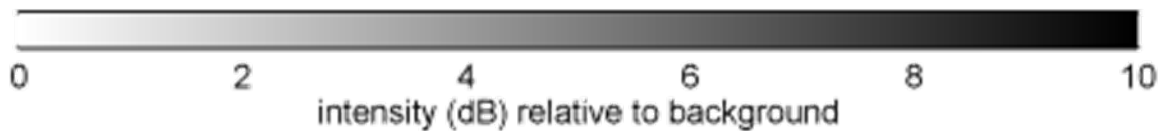
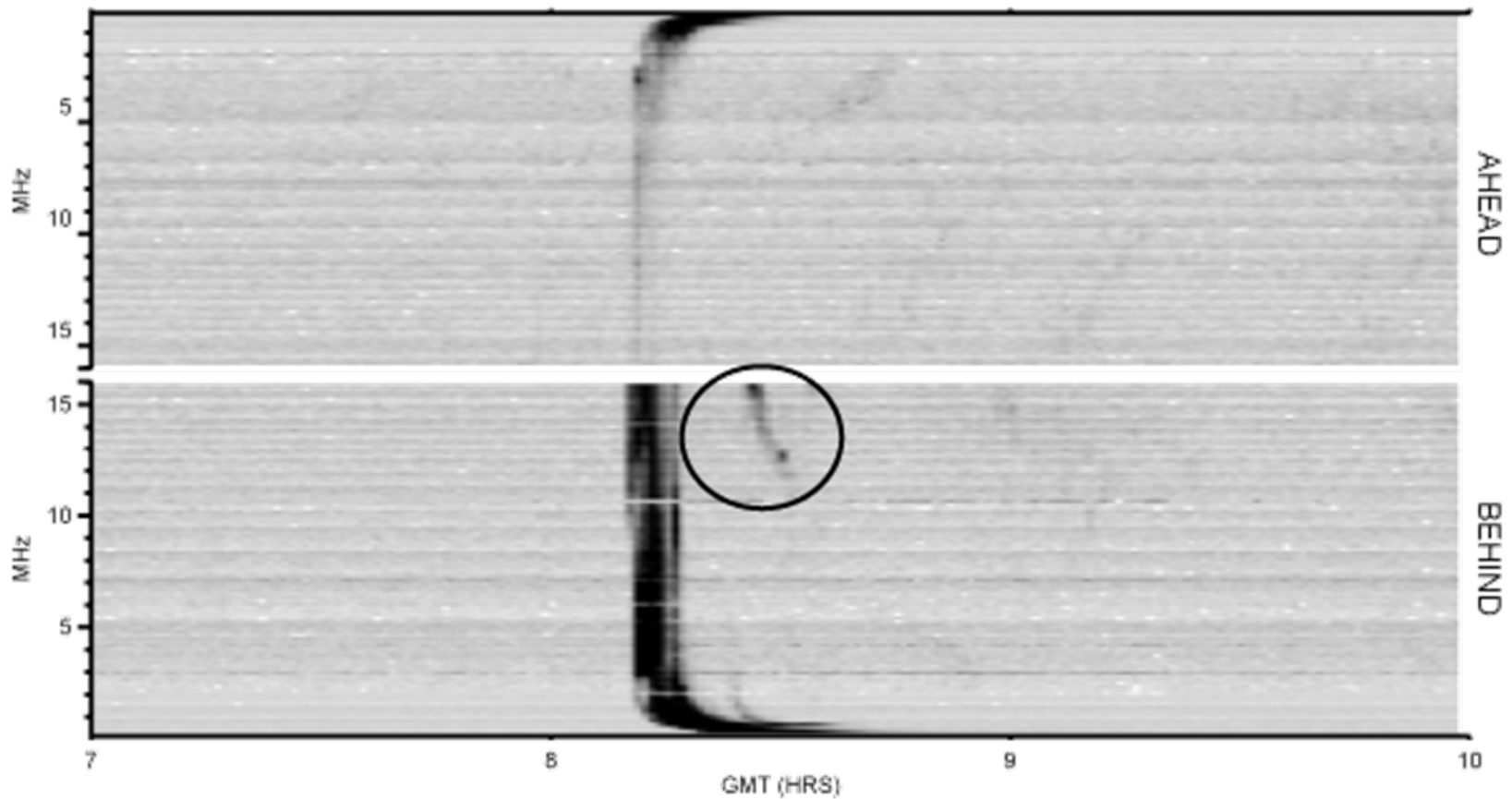
In situ studies with TDS (QTN):

- Dust, nano-particles (Kaiser, Goetz, StCyr, Meyer, Issautier, ...)
- combined plasma and wave observations of electrons in the electron foreshock region upstream of the bow shock, WAVES and IMPACT (Pulupa)
- Wave coupling in Type III emission, simulations (Henri)
- Measurements of Rapid Density Fluctuations in the Solar Wind (Malaspina)
- small scale electrostatic turbulence; comparison with Vlasov-Maxwell simulations (Carbone)
- Foreshock Langmuir waves in STEREO data (Cairns)
- Langmuir waves in the solar wind, comparison to theory (Sundkvist)
- macroscopic properties of the solar wind (Issautier)



Mike Kaiser's legacy!

STEREO Waves 2009/5/5





Instrument status

- Both A & B receivers continue to function nominally
 - No trend changes in HK parameters
 - A few anomalies are tracked with vigor
 - One unexpected/unexplained reset
 - EEPROM error
 - Missing DMA
- Operations continue to go well
 - Commands go up – with routine operations and special sequences
 - Telemetry comes down
 - Associated data products are produced and made available
 - Special situations are handled
 - e.g. S/C resets
 - Flight operations team at APL has been very accommodating
- We have slowly evolved our flight software
 - To improve science
 - To investigate anomalies