

# KAI/KASC Organization and Schedule

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KAI Steering Committee and KASOC

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The final part of the KAI preparation phase includes organisation of the working groups within the Kepler Asteroseismic Science Consortium (KASC) and focused preparations in relation to the selected targets for the KAI Survey Phase to take place in the first 10 months of the mission (and an 10 day commissioning run).

All documentation in relation to the preparation phase can be found at the KASC Scientific Webpage: <http://astro.phys.au.dk/KASC>.

The most important documents (posted at <http://astro.phys.au.dk/KASC/Documents.htm>) include:

- KASC Data Analysis Procedure and Scientific Publication Strategy and Policy described in detail in DASC/KASOC/0009
- KASC Letter of Intent: DASC/KASOC/0012
- Letter of Direction
- Non-disclosure agreement for KASC – need to be signed by all KASC members

The primary target selection procedure for the KAI Survey Phase (based on 42 submitted KASC target proposals) finished on 26 November 2008 where KASOC (Kepler Asteroseismic Science Operations Centre) released the Survey Phase target lists via: <http://astro.phys.au.dk/KASC/targets>

At the target selection page one can find target lists for long cadence and short cadence asteroseismic targets prioritized and sorted (target types and proposals).

## The KAI Survey Phase

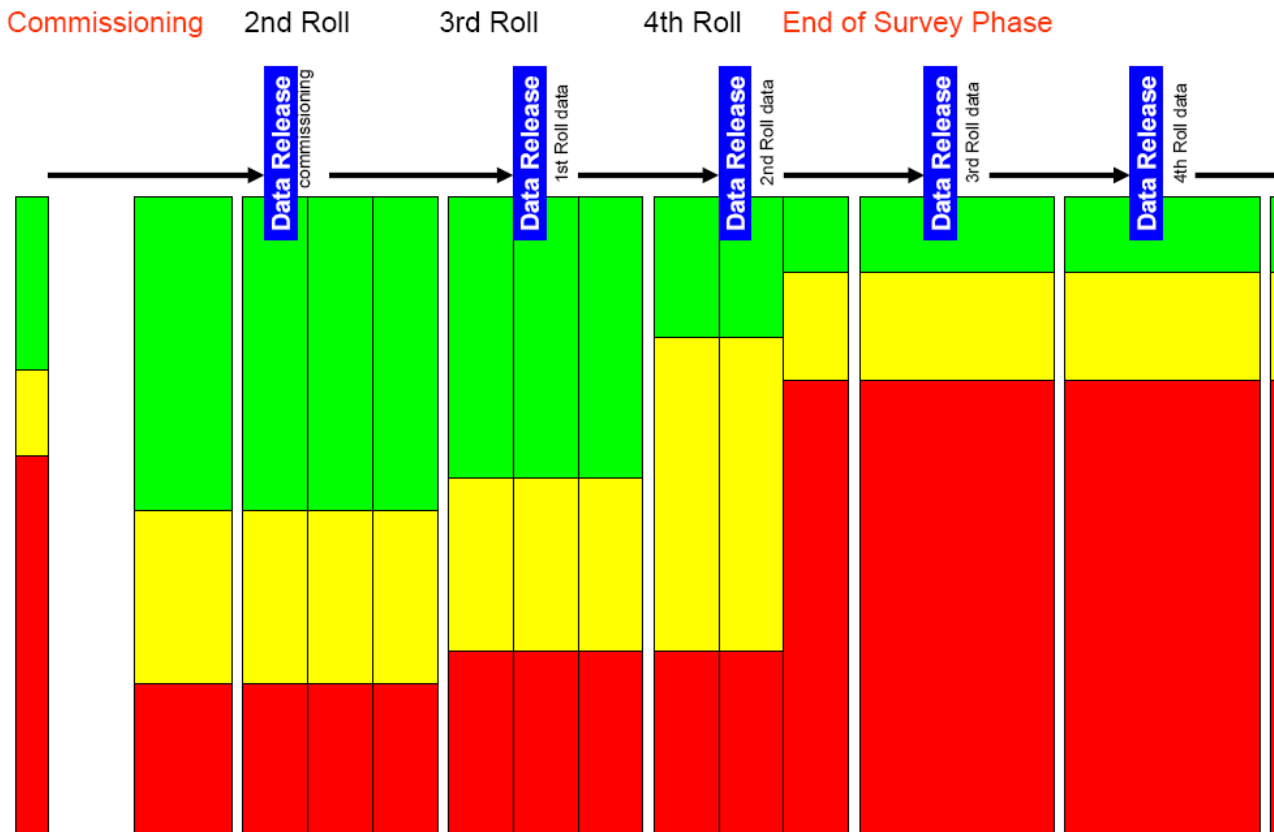
The first part of the Kepler mission includes a survey phase for asteroseismic targets. The survey phase is estimated to run for 10 months and will be followed by the *specific target phase* where fewer targets will be observed for long uninterrupted periods (up to 32 months during nominal mission and an additional 30 months during an extended mission). Based on the many excellent targets suggested for the Kepler Asteroseismic Investigation it was decided to use only 30 day surveys throughout the whole 10 months survey phase. We may survey a few targets for longer during the *specific target phase*; however, no targets will be put on the final Kepler *specific target list* without the 30 day verification done in the survey phase. The aim of the survey is to:

- study stars of as many different types as possible and verify the photometric quality of individual targets.
- use asteroseismology to verify and quantify the KIC parameters to allow optimal use of KIC parameters for the exoplanet programme.

## Kepler Asteroseismic Investigation: Organization and Schedule

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The schedule and expected release of data will depend on the exact launch date, the times for the roll maneuver as well as the length of commissioning phase. The Commissioning is expected to take 30-60 days following immediately after the launch campaign (one hour into flight). A scheduled scientific 8 day commissioning run (in short cadence) will allow a first analysis of Kepler data. From a programmatic point of view we include the commissioning phase as a part of the KAI Survey. Data from Commissioning will therefore be released to KASC and may be published following the procedures described in DASC/KASOC/0009.



The KAI Survey phase consists of the 10-day commissioning run and 10 x 30 days (first 4 Kepler Rolls). The 10-days commissioning took place in May 2009. The first 30 day Survey Phase will then begin in mid-May. The Letter of Direction for the KAI programme states that during first roll all short cadence pixels will be allocated to asteroseismology. The Guest Observer Programme (GO) will use 25 x 85 pixels from second roll and when planet transit candidates are detected in the long cadence data the asteroseismic fraction of the Kepler short cadence will decrease. In the final part of the mission about 240 targets as any given time will be on the asteroseismic target list. The diagram above illustrates the activities during the first part of the mission showing the Commissioning Phase the Survey Phase and the final "Specific Target Phase" that will continue throughout the mission. Indicated is the submitted target lists for the different phases and the likelihood that a given target will be on the final list (more stars than can be put on the list are submitted). Green means likely to be observed, yellow means possible target and red means potential but unlikely to be observed by Kepler.

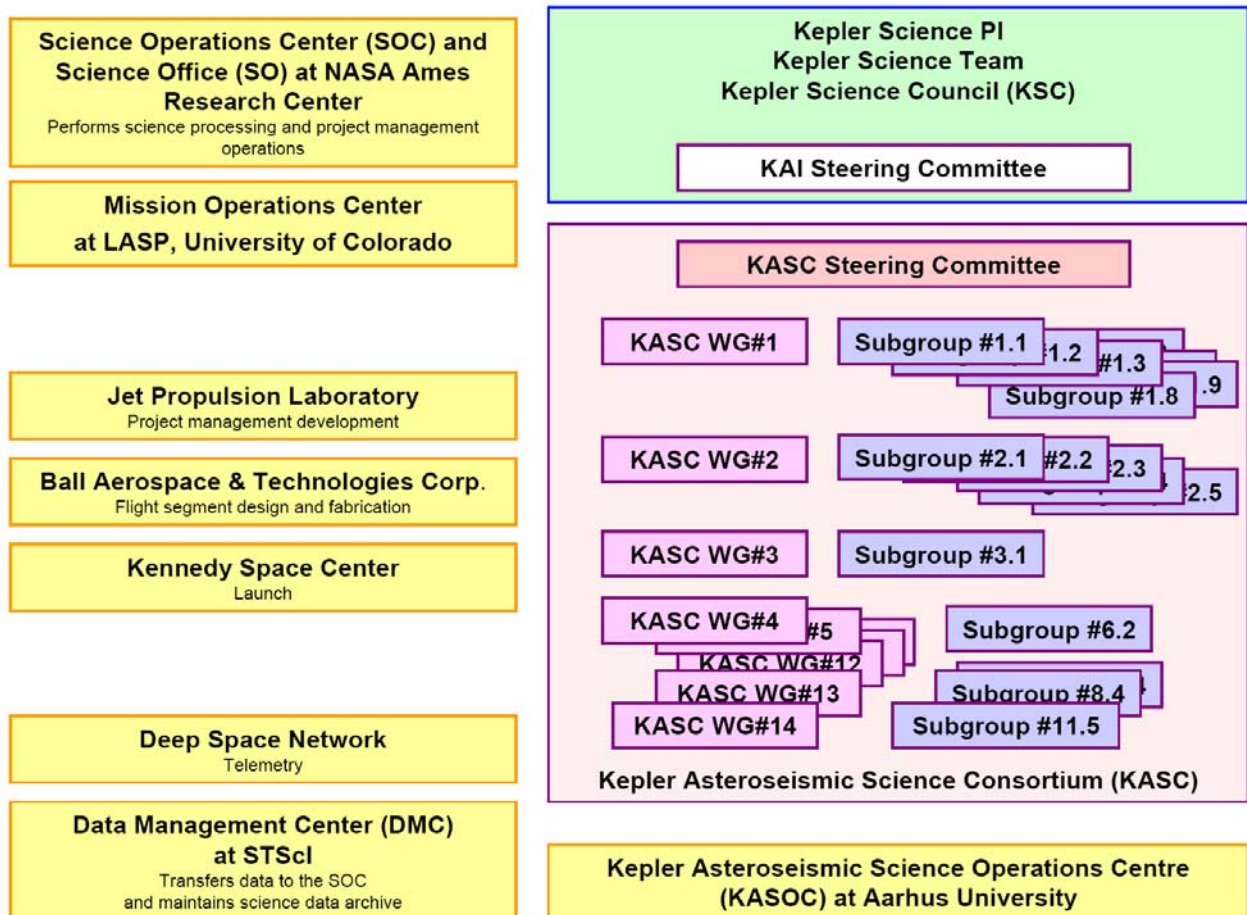
### The KASC Organisation

The Kepler Asteroseismic Science Consortium (KASC) is a large team of scientists that will contribute to different parts of the data analysis of the Kepler Asteroseismic Investigation (KAI) data. In order to organize the work among the several hundred researchers participating in KASC it has been decided to divide the KASC team into 14 Working Groups (KASC WG) each focusing on a special type of pulsations.

# Kepler Asteroseismic Investigation: Organization and Schedule

Each KASC WG will have a WG chair who is responsible for managing and organizing the work related to that given KASC WG. The terms of reference, responsibilities and tasks for the WG chairs are described below. Some of the KASC WG's will be subdivided into subgroups responsible for specific tasks related to that given KASC WG. Each subgroup will have a chair with specific responsibilities.

The Kepler and KASC Organization is illustrated below. Note that KASC refers back to the Kepler Science Team and the science PI (Bill Borucki) and the work on asteroseismology is managed by the KAI Steering Committee (Kepler Science Team members) and the KASC Steering Committee.



The 14 KASC working groups cover the following types of pulsating stars. Each working group will be responsible for time series analysis, stellar modelling, ground-based follow-up observations and publication of the results. The structure of working groups (WG) and subgroups are listed below:

## 1. Solar-like p-mode Oscillations:

**WG chair: William Chaplin, University of Birmingham, UK**

**Email: [wjc@bison.ph.bham.ac.uk](mailto:wjc@bison.ph.bham.ac.uk)**

1.1 Time series analysis I: Extraction of separations and global frequency parameters

Chair: Rafael Garcia, IRFU CEA / Saclay, France

1.2 Time series analysis II: Fit to frequency Spectrum (HH exercises)

Chair: Thierry Appourchaux, Université Paris XI, France

### 1.3 Analysis of mode excitation, and damping

Chair: Günter Houdek, University of Cambridge, UK

### 1.4 Background granulation in solar-like stars

Chair: Christoffer Karoff, University of Birmingham, UK

### 1.5 Stellar Modelling I: Creation of large model grid and comparison between models

Chair: Travis Metcalfe, High Altitude Observatory, Colorado, USA

### 1.6 Stellar Modelling II: Fitting models to observed frequencies

Chair: Mario Monteiro, Universidade do Porto, Portugal

### 1.7 Stellar Modelling III: Rotation, mixing and new physics

Chair: Michael Thompson, University of Sheffield, UK

### 1.8 Analysis of phase variations and long term variations in frequencies

Chair: Yvonne Elsworth, University of Birmingham, UK

### 1.9 Ground-based follow up:

Chair: Joanna Molenda-Zakowicz, University of Wroclaw, Poland

## 2. Oscillations in Clusters:

**WG chair: Sarbani Basu, Yale University, USA**

**Email: [sarbani.basu@yale.edu](mailto:sarbani.basu@yale.edu)**

### 2.1 Time series analysis and background granulation

Chair: Dennis Stello, University of Sydney, Australia

### 2.2 Analysis of mode excitation and damping

Chair: Benoît Mosser, Observatoire de Paris, France

### 2.3 Stellar Modelling

Chair: Sarbani Basu, Yale University, USA

### 2.4 Analysis of phase variations and long term variations in frequencies

Chair: Ian Stevens, University of Birmingham, UK

### 2.5 Ground-based follow up

Chair: Hans Bruntt, Observatoire de Paris, France

## 3. Beta Cephei Stars:

**WG chair: Gerald Handler, Universität Wien, Austria**

**Email: [handler@astro.univie.ac.at](mailto:handler@astro.univie.ac.at)**

### 3.1 Time series analysis, analysis of phase variations and long term variations in frequencies

Chair: Gerald Handler, Universität Wien, Austria

### 3.2 Analysis of mode excitation and damping

Chair: Marian Doru Suran, Astronomical Institute of the Romanian Academy, Romania

### 3.3 Stellar Modelling

Chair: Ian Roxburgh, Queen Mary, University of London, UK

### 3.4 Ground-based follow up

Chair: Maryline Briquet, Katholieke Universiteit Leuven, Belgium

## 3.5 Oscillations in Be stars

Chair: Juan Gutierrez-Soto, Observatoire de Paris-Meudon, France

## 4. Delta Scuti stars:

**WG chair: Donald Kurtz, University of Central Lancashire, UK**

**Email: [DWKurtz@uclan.ac.uk](mailto:DWKurtz@uclan.ac.uk)**

### 4.1 Time series analysis

Chair: Donald Kurtz, University of Central Lancashire, UK

### 4.2 Stellar Modelling and excitation of oscillations

Chair: Jadwiga Daszynska-Daszkiwicz, Uniwersytet Wroclawski, Poland

### 4.3 Analysis of phase variations and long term variations in frequencies

Chair: Andrzej Pigulski, University of Wroclaw, Poland

### 4.4 Ground-based follow up

Chair: Marcella Marconi, Osservatorio Astronomico di Capodimonte, Italy

## 5. roAp stars:

**WG chair: Margarida Cunha, Universidade do Porto, Portugal**

**Email: [mcunha@astro.up.pt](mailto:mcunha@astro.up.pt)**

### 5.1 Time series analysis

Chair: Luis Balona, South African Astronomical Observatory, South Africa

### 5.2 Stellar Modelling

Chair: Margarida Cunha, Universidade do Porto, Portugal

### 5.3 Ground-based follow up

Chair: Donald Kurtz, University of Central Lancashire, UK

## 6. Slowly Pulsating B-stars:

**WG chair: Peter De Cat, Royal Observatory of Belgium**

**Email: [Peter.DeCat@oma.be](mailto:Peter.DeCat@oma.be)**

### 6.1 Time series analysis

Chair: Luis Balona, South African Astronomical Observatory, South Africa

### 6.2 Stellar Modelling and excitation of oscillations

Chair: Ian Roxburgh, Queen Mary, University of London, UK

### 6.3 Ground-based follow up

Chair: Peter De Cat, Royal Observatory of Belgium

## 7. Cepheids:

**WG chair: Robert Szabó, Hungarian Academy of Sciences, Hungary**

**Email: [rszabo@konkoly.hu](mailto:rszabo@konkoly.hu)**

### 7.1 Time series analysis

Chair: Hans Bruntt, Observatoire de Paris, France

### 7.2 Stellar Modelling

Chair: Robert Szabó, Hungarian Academy of Sciences, Hungary

### 7.3 Ground-based follow up

Chair: Robert Szabó, Hungarian Academy of Sciences, Hungary

## 8. Red Giants:

**WG chair: Joris De Ridder, K.U. Leuven, Belgium**

**Email: [Joris.DeRidder@ster.kuleuven.be](mailto:Joris.DeRidder@ster.kuleuven.be)**

### 8.1 Time series analysis

Chair: Saskia Hekker, University of Birmingham, UK

### 8.2 Analysis of phase variations and long term variations in frequencies

Chair: Yvonne Elsworth, University of Birmingham, UK

### 8.3 Stellar Modelling

Chair: Dennis Stello, University of Sydney, Australia

### 8.4 Ground-based follow up

Chair: Søren Frandsen, Aarhus Universitet, Denmark

## 9. Pulsations in eclipsing binaries:

**WG chair: Conny Aerts, K.U. Leuven, Belgium**

**Email: [conny@ster.kuleuven.be](mailto:conny@ster.kuleuven.be)**

### 9.1 Time series analysis

Chair: Ian Stevens, University of Birmingham, UK

### 9.2 Iterative light curve modeling

Chair: Andrej Prsa, Villanova, USA

### 9.3 Stellar Modelling

Chair: Conny Aerts, K.U. Leuven, Belgium

### 9.4 Ground-based follow up

Chair: John Southworth, University of Warwick, UK

## 10. Gamma Doradus stars:

**WG chair: Joyce Ann Guzik, Los Alamos National Laboratory, USA**

**Email: [joy@lanl.gov](mailto:joy@lanl.gov)**

### 10.1 Time series analysis

Chair: Katrien Uytterhoeven, Saclay, France

### 10.2 Stellar Modelling

Chair: Joyce Ann Guzik, Los Alamos National Laboratory, USA

### 10.3 Ground-based follow up

Chair: Katrien Uytterhoeven, Saclay, France

## 11. Compact pulsators:

**WG chair: Steve Kawaler, Iowa State University, USA**

**Email: [sdk@iastate.edu](mailto:sdk@iastate.edu)**

### 11.1 Time series analysis

Chair: Mike Reed, Missouri State University, USA

11.2 Analysis of mode excitation and damping

Chair: Stephane Charpinet, Observatoire Midi-Pyrénées, France

11.3 Stellar Modelling

Chair: Don Winget, University of Texas at Austin, USA

11.4 Analysis of phase variations and long term variations in frequencies

Chair: Roberto Silvotti, Osservatorio Astronomico di Capodimonte, Italy

11.5 Ground-based follow up I: Time series data, Colour photometry, radial velocities

Chair: Roy H. Østensen, Katholieke Universiteit Leuven, Belgium

11.6 Ground-based follow up II: Basic properties, spectroscopy

Chair: Suzanne Randall, ESO Garching, Germany

### 12. Mira stars:

**WG chair: Laszlo Kiss, University of Sydney, Australia**

**Email: [laszlo@physics.usyd.edu.au](mailto:laszlo@physics.usyd.edu.au)**

### 13. RR Lyrae stars:

**WG chair: Katrien Kolenberg, University of Vienna, Austria**

**Email: [katrien.kolenberg@gmail.com](mailto:katrien.kolenberg@gmail.com)**

13.1 Time series analysis

Chair: Katrien Kolenberg, University of Vienna, Austria

13.2 Stellar Modelling

Chair: Robert Szabó, Hungarian Academy of Sciences, Hungary

13.3 Ground-based follow up

Chair: Donald Kurtz, University of Central Lancashire, UK

### 14. RV Taurus Variables:

**WG chair: Hans Van Winckel, K.U. Leuven, Belgium**

**Email: [Hans.VanWinckel@ster.kuleuven.be](mailto:Hans.VanWinckel@ster.kuleuven.be)**

### KASC Steering Committee:

Jørgen Christensen-Dalsgaard – chair (KASOC, Aarhus University, Denmark)

Ronald Gilliland (Space Telescope Science Institute, USA)

Timothy M. Brown (University of California, Santa Barbara, USA)

Hans Kjeldsen (KASOC, Aarhus University, Denmark)

William Chaplin (School of Physics and Astronomy, University of Birmingham, UK)

Travis Metcalfe (High Altitude Observatory, NCAR, Boulder, USA)

Mario Monteiro (Centro de Astrofísica de Universidade do Porto, Portugal)

Thierry Appourchaux (IAS Orsay, France)

Steven Kawaler (Department of Physics and Astronomy, Iowa State University, USA)

Conny Aerts (Instituut voor Sterrenkunde, Leuven, Belgium)

Claude Catala (Observatoire de Paris, France)

Donald W. Kurtz (Centre for Astrophysics, University of Central Lancashire, UK)

### **Terms of Reference, Responsibilities and Tasks for KASC WG and KASC WG Chairs**

The KASC Working Groups (KASC WG) are established to ensure an efficient and structured work within KASC focusing on data analysis, stellar modelling and publication of data. The chair of each working group (and subgroup) is responsible for organizing the work within the working group, define specific tasks and deadlines and ensure that all working group members are involved in the work in agreement with the individual intents expressed in the KASC Letters of Intent. The KASC WG chairs are also responsible for internal information within a given working group and the chair shall keep the KASC Steering Committee informed about the progress of the work within the working group.

Working Group Chairs are appointed by the KASC Steering Committee (KASC SC) and the KASC SC is responsible for selecting new KASC WG chairs if a new working group is formed or a person decides to leave the chair. KASC SC may also advise a WG chair on priorities and other matters (KASC WG chairs may also ask the KASC SC for advice) and KASC SC shall support the KASC WG chairs and assist especially in case of conflicts within a given KASC WG. Any conflict or dispute within a working group should be solved by the group members; however, in case this is impossible the KAI Steering Committee shall propose a solution to the conflict or dispute and the decisions by this steering committee shall be followed.

All members of KASC who have signed a non-disclosure agreement need to submit one or more Letters of Intent. Based on those Letters of Intent KASC members are allocated to the different working groups (KASC WG). There is no limit on the number of members within a given working group; however, the KASC SC needs to ensure that the subgroup structure and the internal organization with any KASC WG will be such that the work is efficient and focused.

As stated in the KASC Data Analysis Procedures and Scientific Publication Strategy and Policy (DASC/KASOC/0009) the aims of the working groups are:

- (1) to ensure coordination of the KASC work in relation to data analysis. All KASC members are expected to collaborate on analyzing and modelling the seismic data, and each member is expected to take an active part in the working group activities.
- (2) to ensure a fast and coherent publication procedure for the primary papers. It is intended that each working group will publish a few key papers related to the relevant data and that those papers will present the general results of the Kepler asteroseismology.

**For the KASC WG chairs the following responsibilities and tasks apply:**

#### **Management:**

- The WG chair refers back to the KAI and KASC Steering Committees. The WG chair shall ensure that all instructions, strategies and policies set by the Steering Committees and the Kepler Science Team are followed and that all WG activities follow the aim of the Letter of Direction. Any questions or need for clarification should be addressed and directed to the appropriate Committee or team.
- Members of a KASC working group shall follow the instructions and advice provided by the WG chair.
- The WG chair shall define in collaboration with the KASC WG members the organization and structure of the work within a given KASC WG. This structure shall include WG subgroups if relevant. The structure shall be presented in written form to all KASC WG members and include issues on distribution of information, meeting activity, WG workshops, deadlines etc.
- The WG chair leads the work within the WG. Individual members of a WG shall share the tasks needed within the group.



- The WG may suggest a change in the proposed structure or may suggest a change in the appointed chairs. The WG chair shall in this case present a proposal to the KASC SC for approval.
- The KASC WG shall ensure a high level of information, e.g., by setting up a webpage for the working group activities.
- The WG chair may suggest new WG team members, especially concerning activities where the team identifies a need for more people (e.g., in relation to data analysis, modelling or ground-based follow-up). If more people are needed to perform the needed work the WG chair shall (in coordination with the KAI and KASC Steering Committees) propose how to include more WG members. All new members shall be approved by the KAI Steering Committee and the KASOC will ensure that Letters of Intent and Non-disclosure agreements are filled out and signed.

### **Data analysis and modelling:**

- The WG chair shall establish all procedures needed to analyze the time series data for the targets related to the WG. This includes extraction of frequencies and other pulsation parameters.
- The WG chair shall set up fast analysis tools to support analysis of all survey targets allowing the WG to submit targets proposals for specific targets in due time for the KASC Specific Target Phase.
- The WG chair shall ensure that the appropriate modelling activities are initiated. The WG chair shall in coordination with the WG members set up a close collaboration between data analysis and modelling.

### **Ground-based Follow-up:**

- The WG chair shall in coordination with the WG analyze the need for ground-based follow-up and analyze to what extent the follow-up will need to be synchronized with the Kepler observations
- The WG chair shall make a strategy on how to obtain the needed ground-based follow-up and contact the people and observatories related to this strategy.
- The WG chair shall ensure that the needed observing proposals are being submitted and that the ground-based data are being analyzed in due time.
- Any person or group involved in ground-based follow-up shall be involved in the team work and in publishing the data. The WG chair shall ensure that those individuals or groups are included in the WG activities and acknowledged appropriately.

### **Target proposals for KAI Specific Targets:**

- The WG will be responsible for submitting proposals for the KAI specific target phase following the survey phase. The WG chair will be responsible for the proposals and need to ensure that the ideas covering research done by all individuals within the WG are represented in the target proposals.
- The WG is responsible for providing priorities (including justification) between different targets within a given proposal and between submitted proposals.

### **Publications:**

- The WG chair shall ensure a fast and coherent publication procedure for the papers related to a given WG. It is intended that each working group will publish a few key papers related to the relevant data and that those papers will present the general results of the Kepler asteroseismology.

- The WG shall present a specific plan on how to publish the results related to the time series data and this plan shall be discussed with the KAI and KASC Steering Committees. The aim is to publish as fast as possible taking into account the time needed to perform a detailed analysis.
- The WG chair shall ensure that the publication policy and guidelines are followed, especially concerning (see DASC/KASOC/0009 for details):
  - o KASC members who work on data related to a specific target (and have expressed an interest by submitting a Letter of Intent) are asked to join a possible subgroup that may be responsible for that target.
  - o Any publication that will be submitted shall be checked and formally approved by the KAI Steering committee before submission. The KAI Steering Committee has the right to modify the list of authors to make it conform with the data-policy guidelines. Prior notification to the KAI Steering Committee is also required for press releases, conference presentations, general talks, etc.
  - o The KAI Steering Committee will keep the PI and Kepler Science Council (KSC) informed of requests for publication and presentation reviews. Early and/or mission-comprehensive papers in asteroseismology will be required to have broader authorship reflecting general contributions of the Kepler Science Team in accordance with NASA policy.
  - o Any paper ready for submission for publication will be uploaded to the KASOC webpage where all KASC and Kepler Science Team members will be able to review and read the paper.
- The WG chair shall ensure that authorship policy is followed (see DASC/KASOC/0009 for details), especially concerning:
  - o The primary author (the person who is doing the major part of the work) of each KASC publication shall be listed first in the authorship list. This is not necessarily a chair of the KASC working group or a person who initiates the writing or organizes the writing.
  - o Any KASC member who writes or contributes substantially to any part of the publication shall be included in the authorship list, if that person so chooses. A KASC member who has submitted a letter of intent is allowed to work on a given KASC data set and will as a result be included in the authorship list provided that the person contributes significantly to the work.
  - o The major papers resulting from the KAI activities and defined by the KASC Steering Committee will need authors from the Kepler team in general. The PI and KSC will be consulted in respect to this as soon as papers are ready for publication.
  - o All authors are supposed to read and approve the final version of the publication before it is uploaded to the KASOC webserver for general reviewing.
- The WG is supposed to collaborate on writing general KASC papers that include results from several WG's. The KASC Steering Committee will appoint a person responsible for coordinating the work in relation to each of the general papers (this will often be a chair of a KASC working group).

### **Schedule:**

- The WG chair shall present a schedule for the work within the WG. This schedule needs to include all aspects in relation to planning, data analysis, modelling, ground-based observing and publications. Milestones, workshops, meetings and deadlines shall be identified with a date. The

dates need to be aligned with the mission schedule, especially concerning data release and submission of target proposals.

- The schedule shall be updated at a regular basis and the KASC steering committee needs to be notified when major revisions of the schedule take place.

### **For KASC WG subgroup chairs the following responsibilities and tasks apply:**

#### **Management:**

- The WG subgroup chair refers back to the WG chair. The WG subgroup chair shall ensure that all instructions, strategies and policies set by the Steering Committees and the Kepler Science Team are followed and that all WG activities follow the aim of the Letter of Direction. Any questions or need for clarification should be addressed and directed to the right Committee or team.
- Members of a KASC subgroup shall follow the instructions and advice provided by the WG subgroup chair.
- The WG subgroup chair shall define in collaboration with the subgroup members the organization and structure of the work within the group. The structure shall be presented in written form to all subgroup members and include issues on distribution of information, meeting activity, workshops, deadlines etc.
- The subgroup chair leads the work within the subgroup. Individual members of the subgroup shall share the tasks needed within the group.
- The subgroup shall ensure a high level of information, e.g., by setting up a webpage for the subgroup activities.
- The subgroup is expected to collaborate with the other subgroups within the working group. The WG chair must be consulted on schedule, publications, activities etc.

#### **Specific Tasks**

- A subgroup will always have a specific task or list of tasks. Those tasks can be related to data analysis, modelling, ground-based follow-up, etc., and in some cases a given subgroup may need to collaborate closely with another subgroup.
- The subgroup chair shall establish all procedures and activities needed to perform the tasks related to this subgroup. This shall be done in coordination with the WG chair.

#### **Publications:**

- The subgroup shall present a specific plan on how to publish the results related to specific tasks relevant for the subgroup. The members are supposed to collaborate with the other subgroups.
- The subgroup chair shall ensure that the publication policy and guidelines and authorship policy are followed (see DASC/KASOC/0009 for details).
- The subgroup is supposed to collaborate on writing general KASC papers that include results from several WG's.

### **Schedule:**

- The subgroup chair shall present a schedule for the work within the subgroup. This schedule needs to include all aspects in relation to planning, data analysis, modelling, ground-based observing and publications. Milestones, workshops, meetings and deadlines shall be identified with a date. The dates need to be aligned with the mission schedule, especially concerning data release and submission of target proposals.
- The schedule needs to be coordinated with the other subgroups and the WG chair must approve the schedule.
- The schedule shall be updated at a regular basis and the WG chair and the KASC steering committee must be notified when major revisions of the schedule take place.