AsteroFLAG Collaboration

Discussion Document Version 2: Getting Started

July 17 2006 (WJC)

History: Update of `aFLAGdisc1.doc/pdf` (version 1 was dated 30 May 2006)

This document provides a framework around which we can base discussion for planning and getting things started. The document is broken into three main sections, covering: the ISSI framework; Team structure and organisation; and the content of the project itself. We will have to make decisions in some areas quite soon. A suggested preliminary timetable is given below (whose content is of course also up for discussion).

I think we can add to, and finalise, this document as we agree on various matters, and the project evolves. I think it would also make sense to have similar, evolving documents in each of the four proposed Team areas (see below). That way, we will all have a clear idea of what our aims and objectives are, and how we are going about achieving them in each of the areas. Finally, in setting our goals, and a timetable to meet them, we should be realistic about what we can achieve.

Updated Suggested preliminary timetable

- At SOHO18/GONG2006/HELAS I (Sheffield, August): Hold a meeting of the group (perhaps an hour-long session?) to discuss Team objectives; **I suggest we do this early afternoon on Wednesday 9 August**. I have already contacted Mike Thompson to 'book' some lecture theatre time.

- Also at SOHO18/GONG2006/HELAS I (Sheffield, August): Discuss team structures and membership, and aim to have these established shortly afterwards

- **Jan 8 – 12 2007, First Workshop at ISSI, Bern** This is now booked with ISSI

- By time of first week-long ISSI Workshop: Teams to have in place many of the tools required to generate and fit the artificial seismic data. The principal aim of the first workshop to be a final decision on the artificial data to be made for fitting.

- Early 2007: Decide on dates for second week-long ISSI Workshop;

- By Easter 2007? Artificial data sent to 'hounds' to fit. Results to be returned by late summer 2007?

- Presentation of preliminary results at HELAS II Conference, Göttingen, August 2007;

- Late 2007: second week-long ISSI Workshop; first papers to be submitted by end 2007.

1. ISSI—what do we get, and what we have to deliver?

- ISSI will host, and provide financial support toward, *two week-long workshops* at ISSI headquarters in Bern, Switzerland.

- Typically, a team would hold its two meetings within a period of 18 months after announcement of the award (which takes us to the end of 2007). ISSI prefer the first meeting to be held within 6 months (so by the end of 2006 for us), but no later than 12 months (May 2007), of the announcement.

  - Our deliverables will be papers submitted to refereed journals, and talks at conferences *etc.* (see the proposal).

  - We asked for, and received, the maximum possible support—accommodation and living expenses will be paid for 15 members of asteroFLAG at each of our two workshops.

- Remember that no travel expenses are paid by ISSI. We will need to find other sources of support to finance our travel (*e.g.*, most likely from our own grants).

- We asked that facilities be provided to host meetings of the full, 23-strong team, facilities ISSI have. However, again, only 15 of our group will have their accommodation and per diems paid by ISSI.

1.1 Decisions we will need to make

- Dates for first ISSI workshop are now fixed (8 – 12 Jan 2007)

- At some point soon, we also need to provide names of the 15 members who will receive support from ISSI. We will need to agree on a clear and fair way of doing this. [Factors to consider may be (in no particular order): ensuring good representation from each of the *asteroFLAG* Working Teams (see below); balanced institutional representation (which may well go hand-in-hand with Team representation); and individual circumstances (*e.g.*, some members may have no funds to draw on).]

2. Organisation of the Group into Working Teams

- In the application, we suggested breaking the Group into Working Teams, with the following responsibilities:

  Team 1: Generation of seismic inputs (*e.g.*, mode frequencies and splittings, damping times and powers) from stellar evolutionary codes.

  Team 2: To make decisions on observational characteristics, *e.g.*, lengths, S/N *etc.* to test.

  Team 3: Will generate artificial time series, with inputs from Teams 1 and 2. Only this team will have knowledge of the underlying content of each set (so they are the 'hares').

  Team 4: The 'hounds' will fit the time series to extract the mode parameters. This team must of course also deal with the mode identification problem.

2.1 Decisions we will need to make

- Are we happy with this Team structure?

- If we are content, we then need to split the Group into teams, with one member serving as the principal point of contact for each Team? It may also be that several of us become members of more than one Team, which I think is not a problem provided no member has too much to do as a result.

- Team structure and membership should be discussed at the SOHO18/GONG2006/HELAS I (Sheffield) meeting in August.

3. What range of stellar parameters are we going to test?

So, we come to the crux of what we are going to do.

- In the application, we said we would fit artificial data for a range of stars on the lower Main Sequence. We also said we would also test the impact of activity cycles on the data; and look at implications for observation and analysis of stars in open clusters.

- In making decisions on what to test, we need to make sure we add value to, and ultimately go beyond, what has been done already (*e.g.*, the COROT hare-and-hounds exercises).

- We should tailor some cases to specific projects, such as COROT, Kepler and SONG; and also consider the different noise levels expected from intensity and

velocity measurements, and various dataset lengths. (See e-mail of JCD, 6 June 2006.)

- Once we have fixed the ranges of input parameters to test, do we test these on a uniform grid (*e.g.*, in fixed increments of the various parameters) or test a random sampling of parameter combinations within the stipulated bounds of the parameter space? Given that there will be quite a number of possible combinations (*e.g.*, different rotational and activity characteristics, element compositions, dataset quality, apparent magnitude *etc.*) a random sampling might be the better option, which would have the added benefit of 'scrambling' sets presented to the hounds for fitting.

3.1 Decisions we will need to make

- There are clearly very many decisions to make in this area! Some of the more important are:
    - Range of basic stellar parameters to test;
    - How to deal with adding in the effects of rotation;
    - How to deal with adding in the effects of activity;
    - Ranges of S/N (in intensity and velocity) and dataset lengths to test;
    - Specific test cases (COROT, Kepler, SONG *etc*.)