Training Opportunity for Irish Trainees

Reference	Title	Duty Station
IE-2018-SCI-OOG	**Development and promotion of a multi-mission coordination tool**	**ESAC**

Overview of the unit's mission:

The INTEGRAL Science Operations Centre (ISOC) at ESAC is responsible for:
• Handling of Announcements of Opportunity and proposals for observations of the INTEGRAL gamma-ray mission, including technical evaluation and support to the Time Allocation Committee.
• Long- and Short-Term planning of observations, including coordination, instrument handling, calibration observations and Targets of Opportunity.
• Support to the scientific community.

Overview of the field of activity proposed:

Scientific demands for simultaneous observations of multiple observatories are growing continuously. This project aims at developing a client that collects information of constraints from multiple telescopes for given sky coordinates and time intervals, plus their respective observing schedules with priorities in order to derive optimized common overlap windows.

All input information from participating telescopes can be assumed to be available in a standardized format using the Table Access Protocol (TAP). First step is to utilize all visibility information to determine pure common visibility intervals. As a second step priorities provided by participating telescope for each visibility interval shall be used to allow identification of preferred or less preferred time intervals, e.g., avoiding clashes with planned high-priority time-critical observations.

As test cases, the visibility and observation services of the ESA missions Integral and XMM-Newton will be used. The output shall first be a graphical visualization of telescope activities and potential priority-weighted availability as a function of time, similar to http://integral.esa.int/mySpaceCal/

Further an internal optimization algorithm shall determine the time intervals of maximum common overlap taking into account respective telescope priorities to also find time intervals that are least invasive to the potential participating telescopes. A list shall be returned giving time intervals in descending order of quality. The final coordination client should be suitable to be made available to any observer (well-tested, portable, and documented).

The potentials of the tool will be demonstrated to the ESAC community in a presentation of show-case examples with Integral and XMM-Newton. The objective of the presentation will be to invite other missions to participate by installing and tailoring the respective services to allow the tool to access their visibility and planning information. The candidate will learn how to program such a service and will thus be able to assist missions willing to participate. Candidate missions are, e.g., Gaia, Euklid, Plato, NuSTAR, HST, or ESO facilities. Also the CESAR group has expressed interest to install the service and use the coordination tool.

Required education:

Master's degree in science or engineering discipline
Java, Javascript, REST technologies