Current actvities at the ESA/ESTEC Meteor Research Group

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Gerhard Drolshagen

Bjorn Poppe

Javier Licandro

Overview

Our holy grail: Flux density of meteoroids

- What is the total mass influx onto the Earth?
- What is the distribution versus mass/velocity?

Why: To allow constraining meteoroid models like IMEX (Soja, this conference)

Theresa Ott
Esther Drolshagen

- **Get detailed understanding of video camera setup**
  - **Albin, this conference**
- **Debiasing meteor observations to obtain flux**
  - **Drolshagen/Kretschmer, this conference; Drolshagen E./Ott, IMC 2014**
- **Upgrading CILBO – additional cameras**

Other projects

- **Orbit computations/VMO**
- **Lunar impact flashes**
- **Meteor spectra**

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Theresa Ott
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CENTER OF APPLIED SPACE TECHNOLOGY AND MICROGRAVITY
ZARM

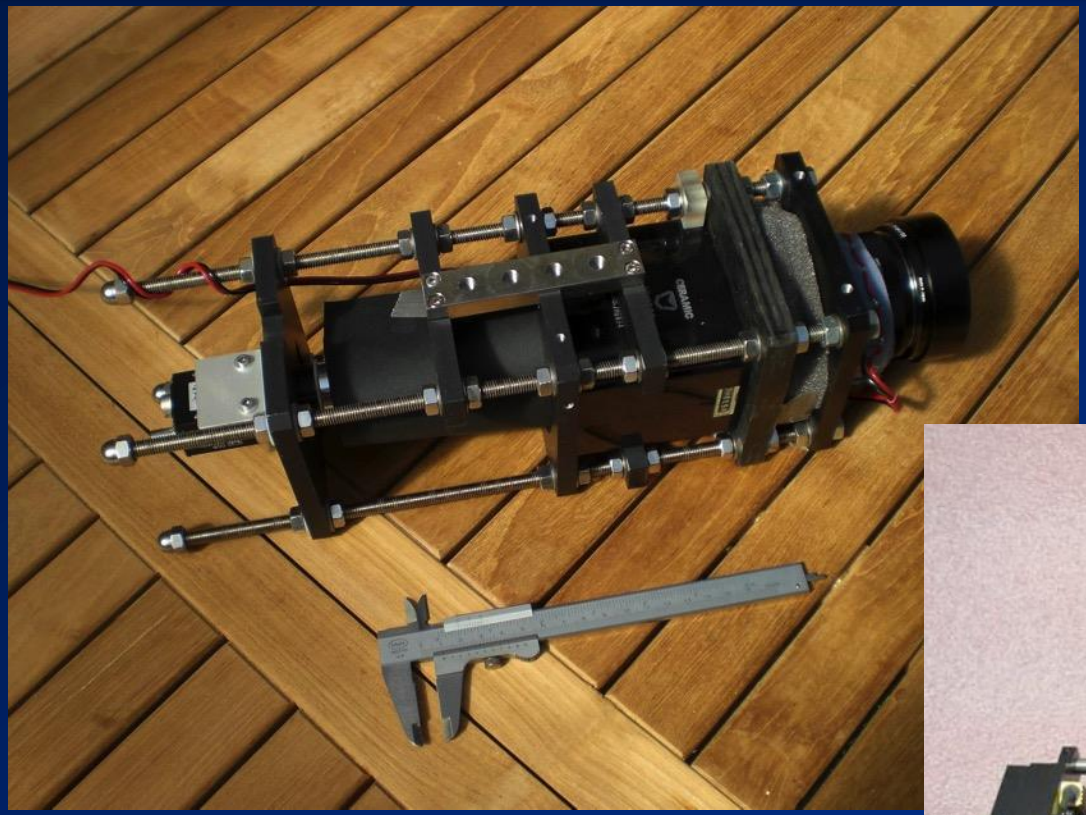
PREISTRÄGER/INNEN 2015

1. Preis: Bianca Reinhard, Faserinstitut Bremen
"Simulation, Testing and Validation of a Marslander Demonstrator"

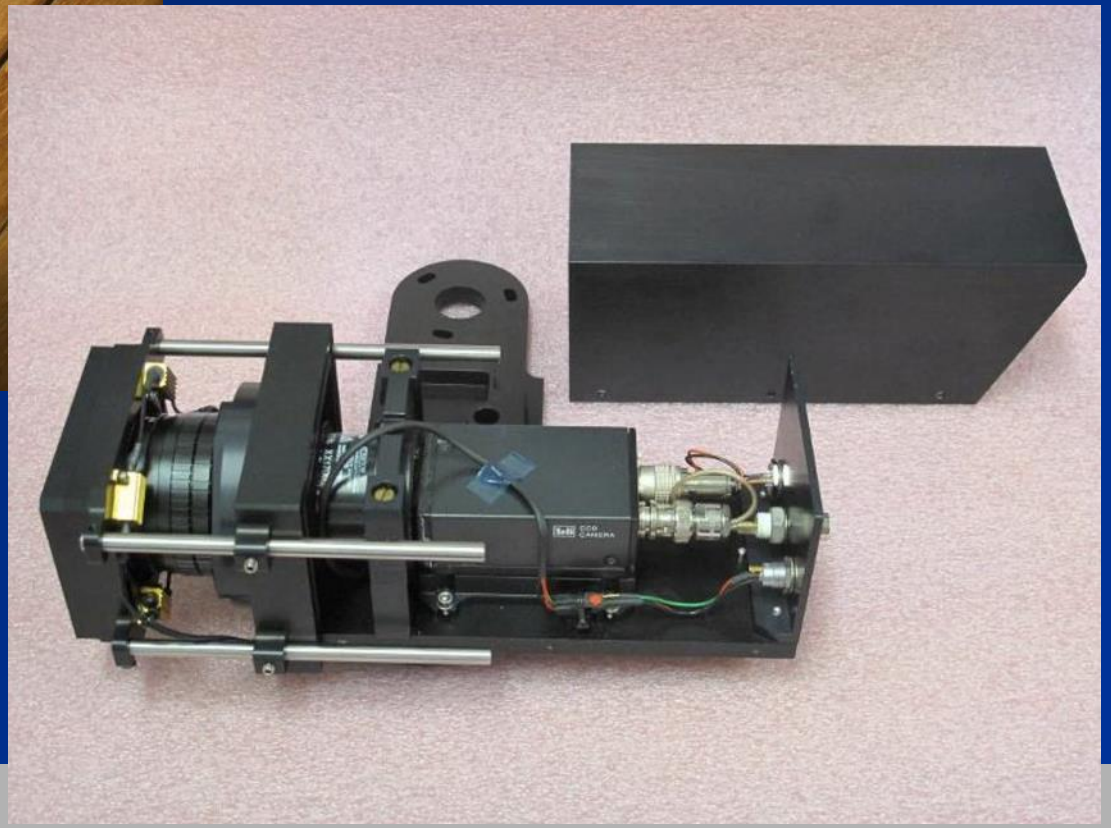
2. Preis: Maximilian Kuhnhenn, TU Darmstadt
"Phasengemittelte Volumenkraftmessungen am DBD Plasma-Actuator mit

3. Preis: Theresa Ott und Esther Drolshagen, Uni Oldenburg
"Meteroid flux and velocity determination using image intensified video can

Our cameras



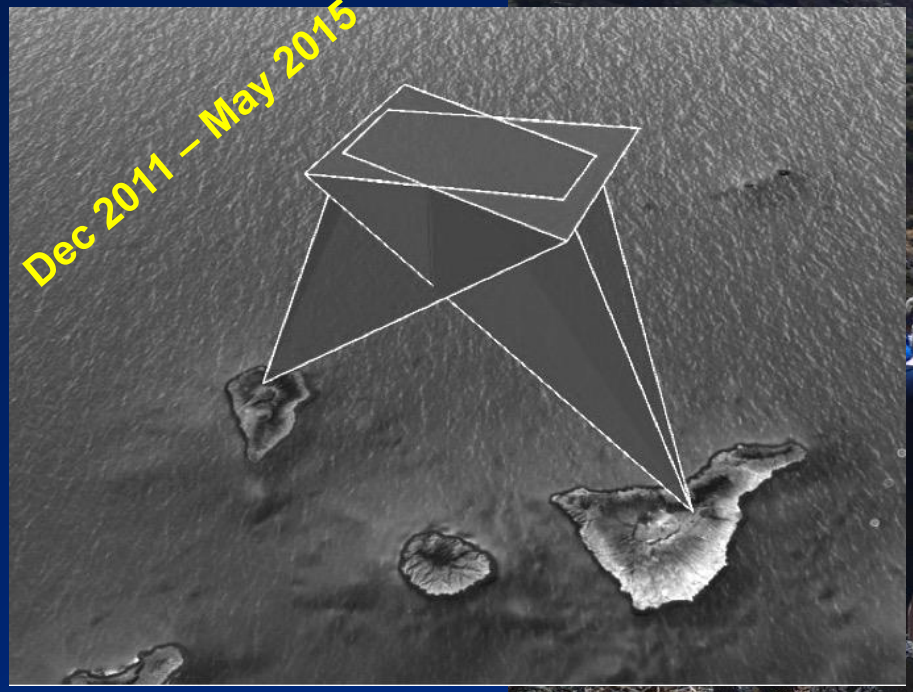
LIC = Large field-of-view Intensified Camera (60 deg)

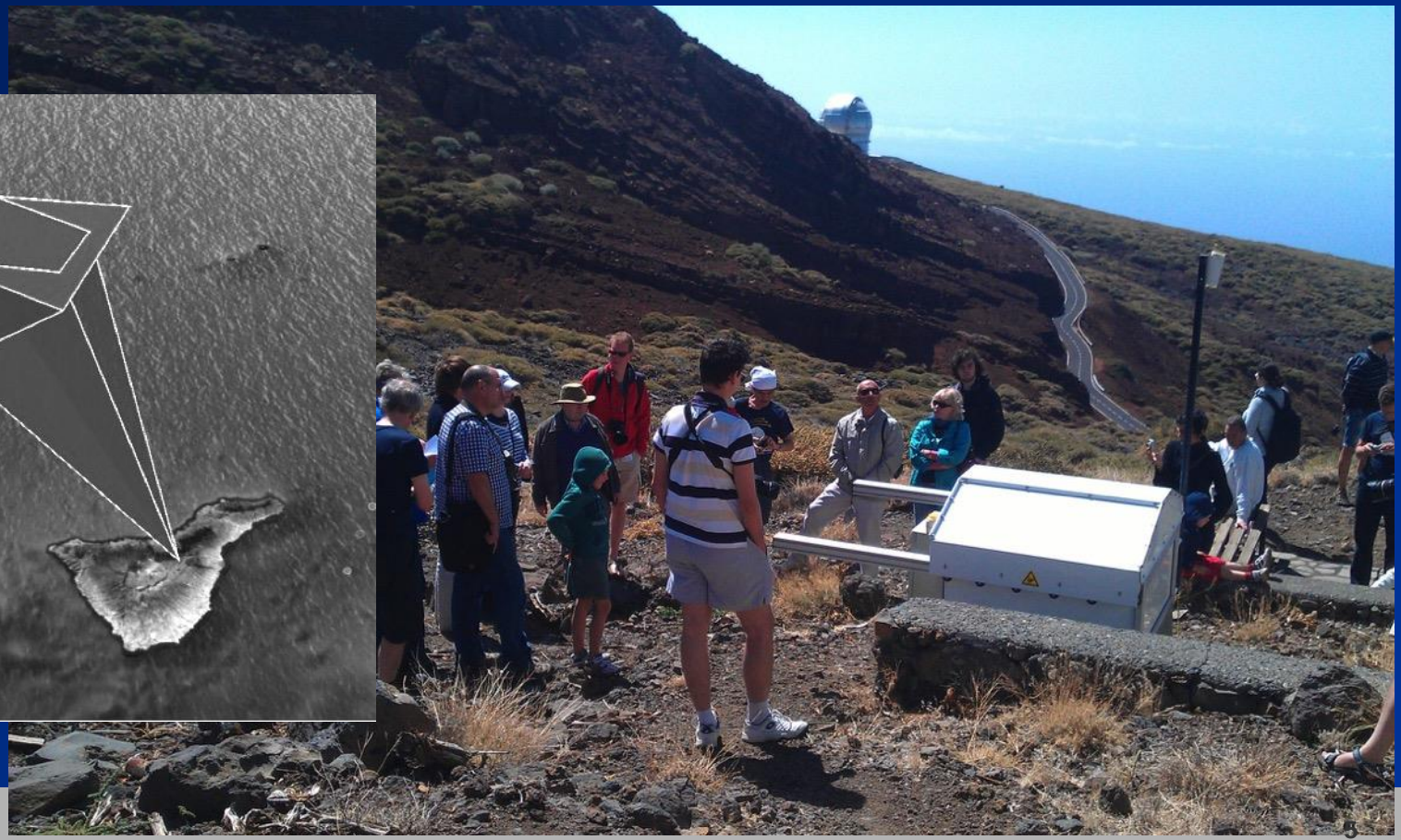


ICC = Image-intensified CCD camera, 22 x 28 deg^2

Canary Island Long-Baseline Observatory

ICC7 Tenerife		ICC9 La Palma		Overlap			Simult.
Hours	#	Hours	#	Hours	# ICC7	# ICC9	
7029 h	46911	6751 h	52201	4212 h	28260	33881	13772





Video camera characterization

- **Use our controlled dataset obtained over two years from CILBO and the VMO database of IMO video camera data to characterize video camera performance**
  - **Example on the right: Number of meteors entering the field of view (FoV, 01), exiting the FoV (10) versus those completely in the FoV**

In_FoV	All	ICC7	ICC9	ICC3	AVIS2	MINCAM1	ORION1	SRAKA
11	196672	17270	10403	2625	39543	10442	2957	6528
10	19469	1725	988	163	1245	1253	403	675
01	10700	1402	732	168	1544	649	280	253

Thomas Albin

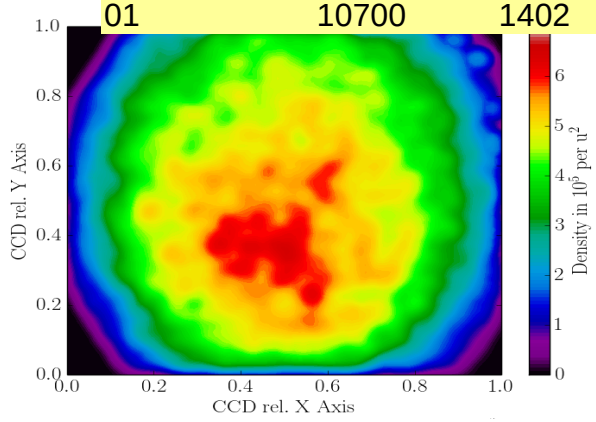
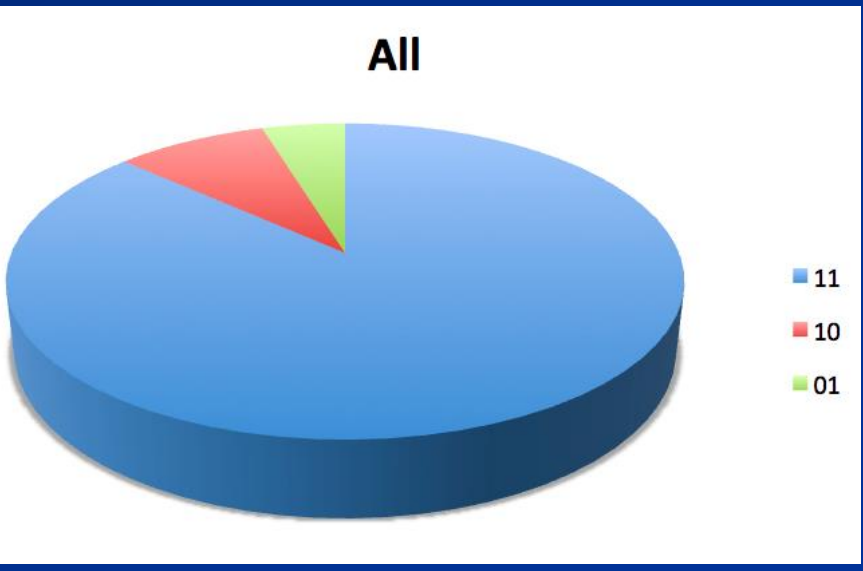


Figure 4.6.: 2-dimensional histogram showing the detected x-y values (from all inf-files) in a norn ized CCD coordinate system representing histogram for ICC7 (magnitude range 2.8 mag 2.9 mag). x and y axis correspond to the size of the CCD chip. The total number of values is color-coded. Additionally, two histograms are added on top and right from the histogram showing the same data but reduced in one dimension.



Albin et al., this conference

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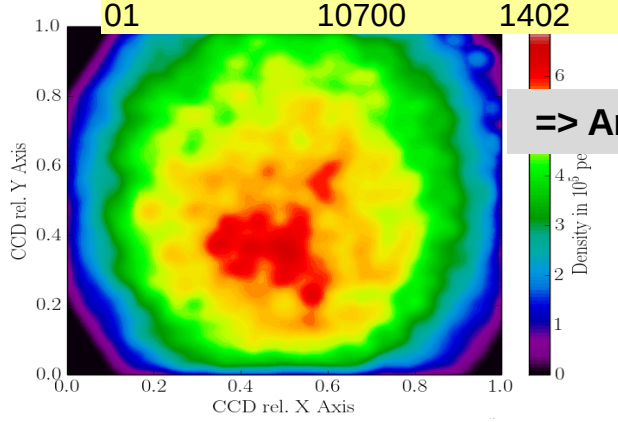

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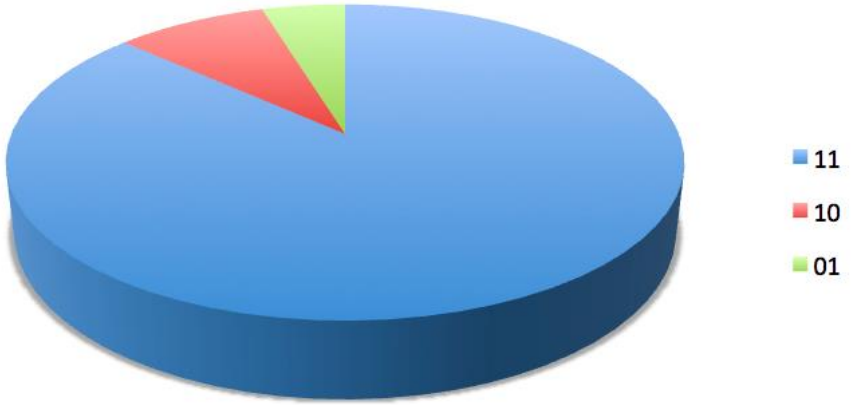
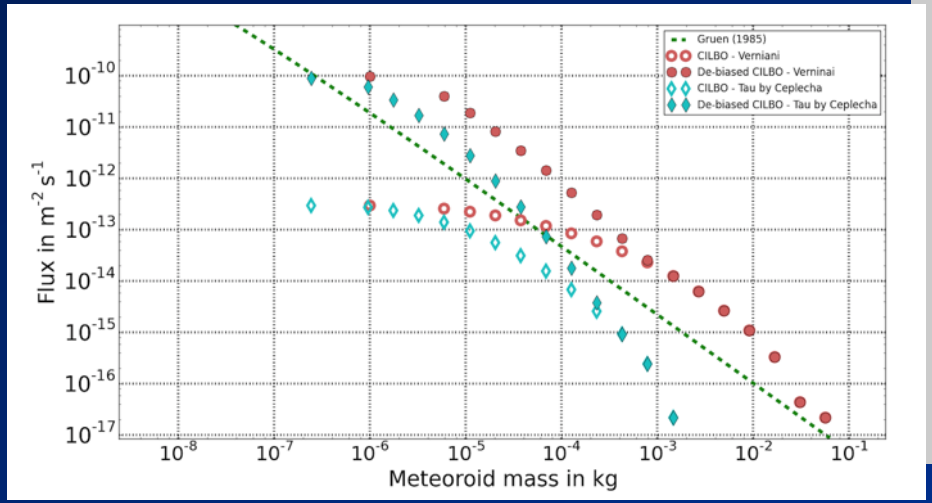
=> Analysis to explain this done by Pavela + Zivanovic, this conf.



Albin et al., this conference

Debiasing double-station data

- How many meteors (and of which magnitude/velocity) do we ***not*** see?
  - See J. Kretschmer's presentations for details
  - Total mass influx -> Pres. Drolshagen



Kretschmer et al., this conference

Jana Kretschmer

Sandra Drolshagen

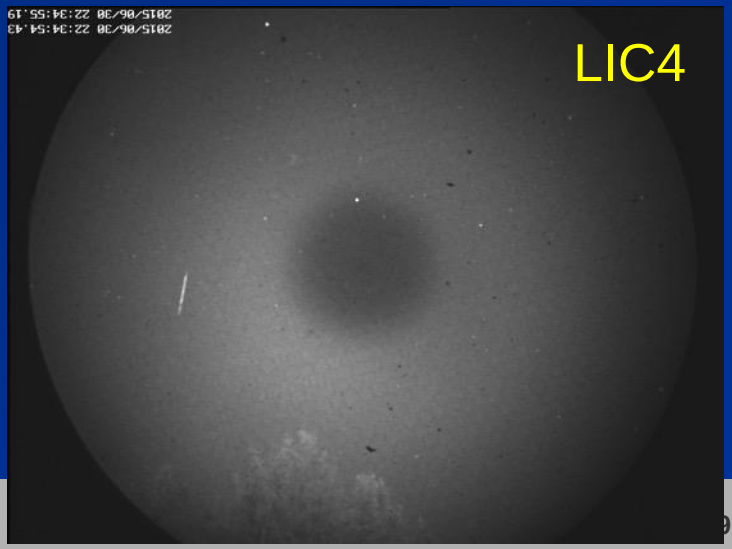
CILBO meteoroids – intersections of trajectory with the 100-km plane

Upgrading CILBO

- **We are in the process of commissioning two new cameras with a larger field of view in the Canary Islands (LIC1/LIC2)**

Hans Smit

Kees v. d. Luijt



Software

- VMO provides IMO video data including all underlying raw data
- Doesn't fulfill ESA security requirements anymore
  - Working on new web interface
  - Needs 'Young Graduate Trainee' for next year – apply until October 2015
- Orbit code MOTS (Koschny & Diaz 2002):
  - Trajectories – stand-alone version available
  - Orbits – close to release
- Quality checking of trajectories implemented

```
#--------------------------------------------------------------------------
class mr_logfile:
    """
    Class for a MetRec log file. Contains data structure for the different
    content elements of the file, and routines to access the data.
    dvk, 20 Jun 2015
    dvk, 25 Jun 2015 - Changed 'previoushour' to 14 instead of 0. This is
                       needed so that one day is added if the first meteor
                       appears after midnight. NOTE: This may not work in
                       Australia! AND: For 20130320 I now get 0 for ICC7
                       (instead of 48).
                     - Updated 'date' - its the date of the file creation,
                       not necessarily the evening of the observing night.

    Parameters
    ----------
    logfile : string
        path and name of one *.log file.

    Usage
    -----
    >>>lf = mr_logfile ('/Users/dkoschny/Documents/Images/Metrec_Data/' + \
                        'ICC7/20111213/20111213.log)

    Properties
    ----------
    filename : string
         Name of the logfile

    software : string
         Name/version of software, e.g. 'MetRec V5.1 (2012/06/28 W32)'
```

Julius Koschny

VMO IMO Node

Lunar impact flashes

- **Used by Drolshagen (this conf.) together with CILBO data, Hubble solar array crater data, and more…**

lunar impact workshop

Cosmos » Lunar Impact Workshop » Programme

- Home
- Programme
- Registration
- Participants
- Workshop summary
- Presentations

OVERVIEW

DAY 01, MORNING SESSION:

- Introduction and goal of the workshop
- Presentation of the current observer groups (IMCCE, Spain, NASA Meteoroid Environment Of
for detection, software for data analysis

DAY 01, AFTERNOON SESSION:

- Linking lunar seismology and impacts
- Modelling impact flashes

DAY 02, MORNING SESSION:

- Linking the lunar impact observations to meteoroid flux measurements
- The need for collaboration

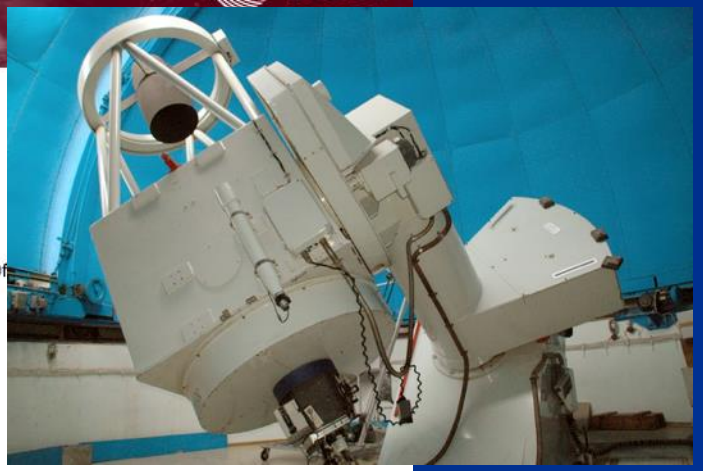
DAY 02, AFTERNOON:

- Summary of the workshop and future work

DETAILED SCHEDULE

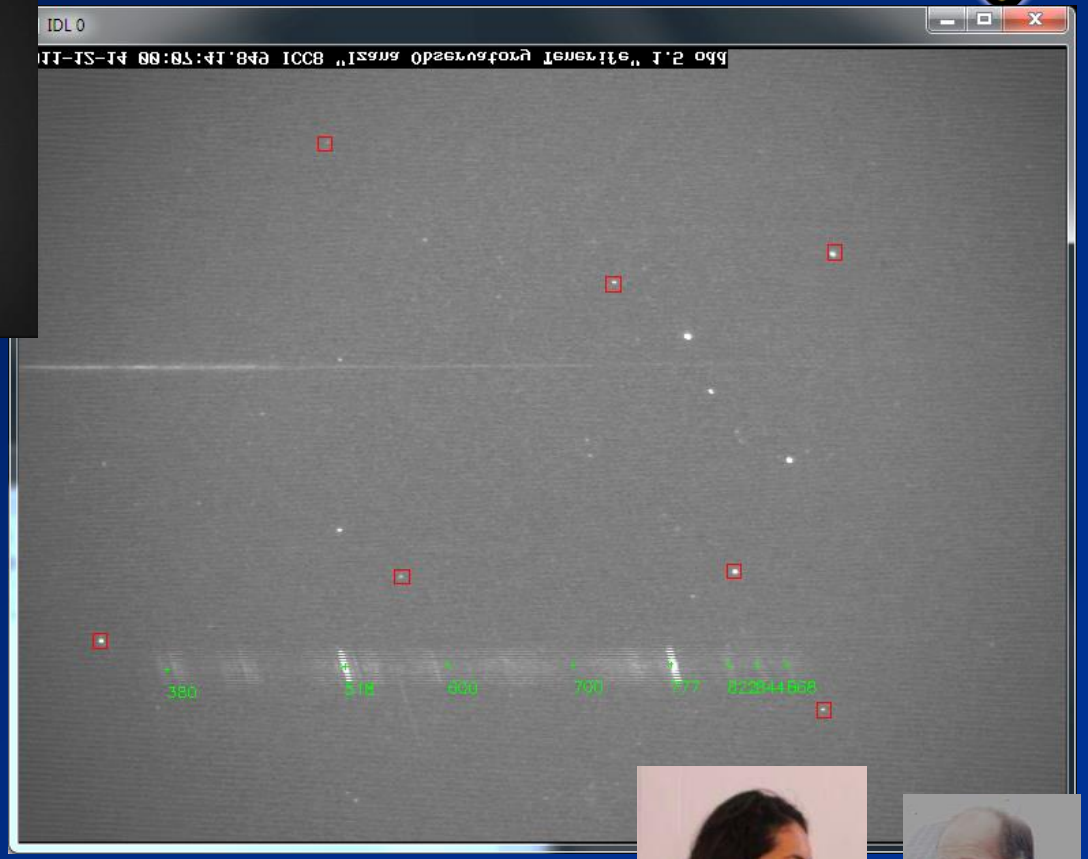
Day 01

10:00 Introduction and goal of the workshop (Koschny)
10:15 NELIOTA - an ESA-funded project to perform lunar impact flash observations in Greece (Bonanos)
10:45 Instrumentation and photometric calibration of the lunar impact monitoring program of the NASA Meteoroid Environment Office (Suggs, Moser)
11:15 Coffee break



http://neliota.astro.noa.gr/neliota_project.html

Meteor spectra



Cosette Molijn

Joe Zender

- **An automatic pipeline for the calibration of meteor spectra, C. Molijn - Bachelor's thesis, Univ. Utrecht**

Summary

- ESA's Meteor Research Group is actively working on understanding meteor video camera data
- Current focus on flux density determination
- A new post-doc will join in October
- Young Graduate Trainee position will open in October