Summer 2012

Euclid newsletter

Issue 1, June 2012

Create a logo before June 14
(see below)

Contents

The View from the Bridge

Dear Euclidians and friends of Euclid.

On October 4, 2011, ESA selected Euclid as the second Medium class mission of the Cosmic Vision program. This success put European physicists and astrophysicists at the forefront of the exploration of the source of the accelerating expansion of the universe for the next two decades and offers to Europe a chance to pin down one of the most fascinating question of fundamental physics and cosmology. The formidable momentum generated by the selection re-focussed and re-energised all scientists and engineers working on the Euclid mission in order to be fully ready for the adoption, expected at the next SPC meeting on June 19-20, and start the Euclid Marathon today, until its launch by the end of 2019...

Copenhagen group photo
Credit: Bjarne Sørensen/Space Science Center

The Euclid mission is also an opportunity for us to promote physics and astronomy through the next generation young scientists and offer them a chance to have a dream and contribute to a quest for unknown territories, in the underlying new fields of physics that sit below the question of the cosmic acceleration. Euclid is a kind of gift ESA and the Euclid Consortium would be proud to share with them.

But young scientists are not the only ones who may be fascinated by the mission. The growing interest of Euclid in the physical and astronomical communities worldwide, for both the cosmology core program and its unique Legacy value, has been disclosed by the most recent Euclid Consortium member list issued in May 2012. About 1000 scientists and engineers are now listed, making Euclid the biggest Consortium ever set of a European space astronomy mission.

Welcome!

Welcome to the first issue of the Euclid newsletter. This owes its origin in a desire from many of you to hear more about what is going on in the collaboration away from what you are immediately involved in. With around 900 members, the Euclid consortium is a large and multi-faceted group. Some of you will spend a large part of your time in the coming years on Euclid, others maybe less so; and most of you will not always be aware of what goes on far from your area. With this newsletter we hope to contribute to keeping the Euclid community informed of what we all are doing, but this will only be possible with your help.

The aim of the newsletter is to cover all aspects of Euclid - from those building the instruments and the infrastructure essential for the success of Euclid to the scientists that will use the data. To cover all this, the plan is to have one or two science topics, a report from an OU and the ground segment or the instrument teams in each newsletter.

Euclid will enable ground-breaking science and is such an exciting, but complex, mission that we hope it will be easy to fill the pages. To achieve the goals of the newsletter we do, however, rely on your willingness to contribute. Please let us, and if relevant your coordinator, know if you would like to contribute something to the newsletter. We would also like to hear about any Euclid-related press releases you might issue during the year to provide links to these in the newsletter.

Jarle Brinchmann & Richard Massey (editors)
Contact: euclidcoms@services.cnrs.fr

The 3rd Euclid Mission Conference was held in Copenhagen from May 14 to May 18 and was a great success. With 350 participants and 18 splinter sessions organised during the 5 days of the meeting. The excellent spirit and liveliness of discussions during the sessions and the breaks have shown the enthusiasm and the growing interest of the physics and astrophysics communities for the Euclid mission. The next meeting will take place in May/June 2013.

Video interviews are now available on Youtube and through the EC web site http://www.euclid-ec.org/.

The Euclidian community is big, very big, and the Euclid Organisation is complex. We should therefore thank and welcome the initiative of the Euclid Consortium COMmunication group to set up a Newsletter. We hope that it will be a rapid, simple, lively and permanent communication channel between all of us. The Euclid Newsletter should keep everyone informed on the current status of the Euclid project, highlight most important events and milestones and give you a better understanding on the Euclid organisation and better knowledge of the Euclid key persons. I do hope this letter is the first of a long series... until the very last scientific outcomes of Euclid... in about 5000 days from now.

Yannick Mellier

The Euclid logo competition.

This is now in its closing stages with a closing date of June 14. See http://euclid.roe.ac.uk/projects/coms-public/wiki/Logo_competition for full details. There are already a number of exciting ideas on that web site, inspire yourself!

News from the study scientist

In June this year, the multi-lateral agreement between ESA and the contributing European funding agencies, as well as the Euclid cost at completion, are on the agenda to be endorsed by the science programme committee. The adoption of the mission is a major milestone after the selection of the two dark energy proposals SPACE and DUNE in 2007, the assessment phase (2008-2009), and the definition phase (2010-2012). The merging of the SPACE and DUNE concepts into one single mission, Euclid, compellingly strengthened the science case. It has also created a large and enthusiastic Euclid community, prepared for a long standing commitment to make this mission a success.

The assessment phase concentrated on the question "what" we desired, whereas the definition phase was all about the question "how". The precise formulation of the requirements to describe the full experiment was the main ingredient of the definition phase. During the last months ESA, the consortium and industry spending all efforts to finalize the requirements, finding correspondingly feasible design solutions, as well as ensuring that the proposed technologies have sufficient maturity. It took a lot of creativity and hard engineering work (writing documentation!) To get this far, but I think that we have a solid blueprint for the next phase to be kicked-off after the mission adoption. At the moment we are in transition.

The newly appointed Euclid project team will prepare the spacecraft procurement, which is accomplished in two steps. First, an Invitation To Tender (ITT) will be issued for the Payload Module (PLM). The PLM includes the telescope with truss and baffling, thermal control, and the instrument accommodation with optical bench and shielding. Second, once the PLM contractor has been selected, an ITT is released for the system engineering and Service Module (SVM). The SVM supplies for instance the spacecraft power, attitude and orbit control, and communications. The successful bidder to this ITT will become the prime contractor, who will also become responsible for the PLM procurement and the overall system performance. Meanwhile the mission operations centre at the European Space Operations Centre (ESOC) in Darmstadt and the science operations centre at the European Science Astronomy Centre (ESAC) in Madrid are set up to support the ground segment operations part of the mission.

The studies have ended and the mission implementation will start. With a launch date not before the end of 2019 we still have a long time ahead. No doubt we will have plenty of issues to solve and each planned milestone will be a major effort. ESA, the consortium, and industry are ready for the challenge. Before we dive into this new adventure, let us pause for a moment and celebrate together the achievements so far.

René Laureijs

The Science Ground Segment

The concepts and organisation of the Science Ground Segment (SGS) are concisely described in section 7 of the Euclid Definition Study Report (the "Red Book"). After the mission selection on October 4th 2011, an intense organisational activity has started to bootstrap the implementation activities defined in the SGS work breakdown structure. All but one of the Organisation Units (OUs) dealing with specific aspects of the data processing have held their kick-off meetings. Additionally, a full-week global SGS kick-off meeting was held in Bologna in early March, including the representatives of the national Science Data Centres (SDCs). This allowed in-depth discussions of the specific aspects of the SGS, and at the same time the coordination between the various components and a common understanding of the existing issues. Currently, activities are aimed at cross-checking the correctness of the data flow between the individual processing steps, and at conceiving the overall system so as to satisfy the requirements set in the Ground Data Processing Requirements Document (GDPRD).

Interfaces

An important achievement has been the definition of an initial set of agreed-upon interfaces between the SGS and the Science Working Groups (SWGs), aimed at avoiding duplication of work and confusion in the setting of responsibilities. Since the implementation of the infrastructure and the definition of tools and standards is a prerequisite for the implementation of the SGS, the System Team (which includes both members of the Euclid Consortium and of the ESA/SOC team) has dealt with engineering aspects much before the actual selection of the mission. Its activities are rapidly increasing, with the purpose of preparing a mock-up system (including a basic data model, an embryo archive, a simple abstraction layer to allow the code portability across platforms) which will demonstrate the feasibility of a data-centred and distributed data processing environment. Some preliminary descriptions of metadata products are under discussion with the simulation and external data organization units. These descriptions take into consideration as far as possible: standards and IVOA works. A first set of Common Tools concerning software technology (design, coding, testing) has been selected and some thinking about the deployment (centralized or distributed) of these tools is ongoing. The efforts will also concentrate on the Euclid Mission Archive (EMA) and on the migration of public data to the Euclid Legacy Archive (ELA).

Reviews

Another important aspect being tackled is the planning of a smooth transition between the various phases of instruments on-ground testing and operations, by harmonising the activities of the instrument and SGS teams, including the SOC.

The SGS will be subject to a regular reviewing mechanism. While the review schedule is still being negotiated, it is envisaged that the first review will occur in the first half of 2013.

Marc Sauvage & Fabio Pasian

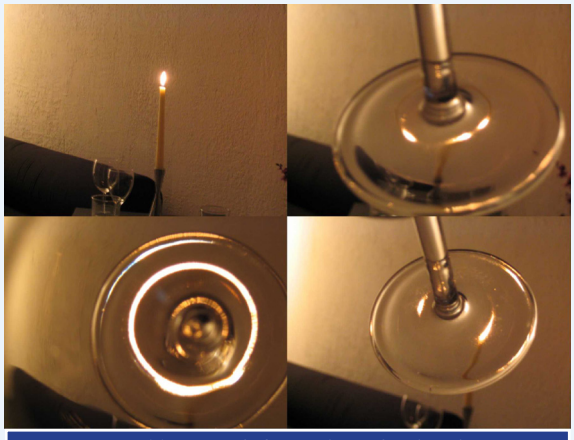
The Science of Euclid

Each issue of the Euclid newsletter will allow one or more science working groups to present some of the science they expect to do with Euclid. This time we find out about weak lensing, one of Euclid's two primary probes of cosmology.

Studying the cosmos with weak lensing

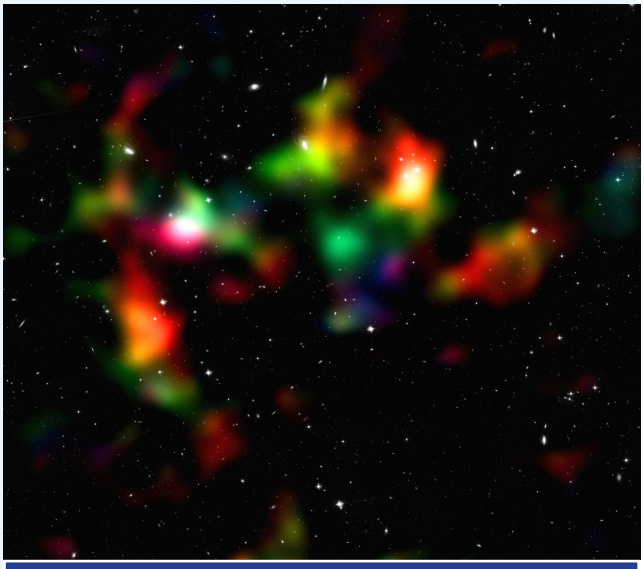
Over the past few decades, our understanding of the Universe has dramatically changed. Not only have we come to realise that the majority of matter in the Universe is invisible, i.e. the so-called dark matter, but we have also discovered that the Universe is expanding at an accelerated rate which either requires the existence of an hitherto unknown component dubbed dark energy, or a modification of the laws of gravity. These dark components cannot be observed directly, but their presence is deduced from the effects they have on the observable Universe. In order to unveil their nature, various methods have been developed in recent years. Weak gravitational lensing is one of the most powerful of them.

The observed images of distant background galaxies are distorted by the inhomogeneous cosmic matter distribution through gravitational light deflection: they are gravitationally lensed. Consequently, the large-scale structure of the Universe imprints a weak but coherent distortion pattern onto the images of background galaxies. The distortion pattern only depends on the distribution of matter, but is independent of its nature. By correlating the shapes of the background galaxies, we are able to characterize this total (dark + visible) matter distribution. By also estimating the background galaxy redshifts, which are related to the age of the Universe at the time these galaxies emitted their light we observe today, we can study how this distortion field - and therefore the distribution of matter - changes with time. The growth of structure sensitively depends on dark matter and dark energy, whose properties are therefore constrained by these measurements. A major advantage of weak gravitational lensing over other methods is that it is the only one that provides a direct measure of the total matter distribution and its evolution without relying on assumptions on the relative distribution of luminous and dark matter.



A gravitational lens uses different physics but has the same net effect as a glass lens. From the distorted images, it is possible to reconstruct how much glass is along a line of sight, even though it is completely transparent.
Image courtesy Phil Marshall

Euclid will constitute the most powerful currently planned weak gravitational lensing experiment to study the properties of dark energy. Observing from space, it provides the best possible conditions for weak lensing measurements: the absence of a blurring atmosphere, the low sky background and very stable conditions are key requisites in order to reach the accuracy needed for precision dark energy constraints. Additionally, it will provide NIR photometry of the galaxies which are essential for determining their redshifts, and these observations are only feasible from space for large samples. Euclid will survey nearly the entire extragalactic sky, measuring the shapes of an incredible amount of 1.6 billion galaxies usable for weak gravitational lensing. Combined with the clustering measurements, this will lead to constraints on dark matter and dark energy that are roughly 50 times better than previously achieved. Since this will undoubtedly lead to new insight into the properties of these dark components, Euclid forms a giant leap forward in understanding the Universe we live in.



A smoothed reconstruction of the total (mostly dark) matter distribution in the COSMOS field reconstructued using weak lensing analysis (from Schrabback et al 2010, A&A, 516). The colours indicate the distance to the inferred mass concentrations, going from white, through cyan, green, orange and red being the most distant.

Image credit: NASA, ESA, P. Simon, T. Schrabback

Edo van Uitert and Tim Schrabback

Science Working Groups

The science working groups (SWGs) organise the scientific exploitation of Euclid data. At these early stages the majority of their work has focused on ensuring that Euclid can achieve its scientific goals. The main constraints on the mission come from the primary science - involving in particular the Weak Lensing and Galaxy Clustering SWGs. The Galaxy Clustering SWG is paying particular attention to the spectroscopic part of Euclid and the interaction between the SWG and the relevant organisational units (OUs) was the main topic at their meeting in March in London and before the Copenhagen meeting in May. The weak lensing science depends, in contrast, on the ability to accurate measure shapes of galaxies. The weak lensing SWG has therefore been spending time trying to understand the effect of the colour-dependence of the point spread function of the instrument and how this affects the shape measurements. Parallel to these efforts, work is ongoing on techniques for calibrating detector effects such as CTI, and characterising how intrinsic alignment effects impact the requirements on photometric redshift requirements amongst many other science activities.

Theoretical preparations

The theoretical aspects of the Euclid science case, and understanding what questions will be important when Euclid flies, is the responsibility of the theory SWG. As part of this effort they have written a theory review document which provides the focus for future work in the group (arXiv:1206.1225). The working group also provides support for calculations, forecasts, optimisations, data analysis algorithms, numerical simulations and probe combinations, in collaboration with the other SWGs. The cosmological simulations, however, fall under the Cosmological Simulation SWG. This group has been active defining the requirements on the simulations, and more recently interfacing with OU-SIM which will create simulated Euclid simulations. They are currently writing the main requirements on simulations that flow down from the corresponding science requirements of the mission

Clustering and correlation

The Galaxy clusters SWG is currently active writing up a paper on their approach to forecast how well clusters of galaxies can be used to determine cosmological parameters. They have close connections to OU-LE3 and overlaps with the galaxy & AGN evolution SWG when it comes to galaxy evolution in and around clusters. It is indeed common that SWGs have close ties to other groups. This is especially true for the CMB cross-correlation SWG which links expertise from Planck and other CMB experiments into the Euclid and the various cosmological studies.

Legacy science

The main activity for those SWGs not directly concerned with the cosmology aspects of Euclid, the **legacy SWGs**, has been the construction of the Legacy Requirements Document (LRD). This internal document, when it is finished, will provide an overview of what we need to ensure that we can get as much legacy science out of Euclid as possible. The Galaxy & AGN evolution and Primeval Universe SWGs are both also concerned about the placement of the Euclid Deep Fields and will be working with the survey team to optimise their placement. This was a topic that both groups discussed in their kick-off meetings in Copenhagen in May. The Milky Way & Nearby galaxies SWGs have also interest in the placement of the Deep fields and have also, along with other groups, been discussing in detail what the impact of different strategies for the release of Level Q data will be.

Defining new surveys

Two SWGs with a slightly different status are the Exoplanets and the Supernova & Transients SWGs because neither group is (yet) guaranteed to get the data they need to carry out their science. They are therefore working hard to determine what is needed. The exo-planets group has studied the potential for using Euclid to conduct a microlensing survey for cold exoplanets with the aim to determine the exoplanet distribution function down to Earth mass for all host separations larger than 1 AU, including possible free-floating exoplanets. In contrast the SNe group is more focused on cosmology and have studied several survey strategies and their impact on searches for distant supernovae. They conclude that the power of Euclid for SNIa cosmology depends strongly on whether certain constraints can be relaxed: for example a dedicated SN survey that allows longer-than-standard near-IR exposure time would be of great benefit.

Should I join an OU, or a SWG? Chances are that if you ask this question you could do both. The science exploitation of the Euclid data will eventually be coordinated by the SWGs but the success of Euclid relies on people contributing their expertise to the OUs.

You can find the contacts of the SWG and OU coordinators at the end of the newsletter.

Changes

Several SWGs have seen some changes since Euclid was accepted, Gianni Zamorani stepped down as co-lead for the Galaxy & AGN evolution SWG, and Andrea Cimatti has replaced him. In the supernova SWG Filippo Mannucci stepped down as deputy lead because of other commitments and was replaced by Enrico Cappellaro. Finally Bianca Poggianti has come in to replace Peppo Gavazzi as co-lead of the Nearby Galaxies SWG. Speaking of the Nearby Galaxies SWG, the main change in the organisation of the SWGs is that this no longer exists. Instead we now have the Local Universe SWG which tackles the Universe out to about z=0.1, and the very nearby galaxies where detailed colour-magnitude diagrams can be assembled is now organised in the Milky Way and Resolved Stellar Population SWG. In the coming months several of the SWGs will undergo some internal re-organisation with sub-groups being defined for specific tasks.

Jarle Brinchmann based on input from the SWG leaders

What does the acronym stand for? SciRD

This stands for the Science Requirements Document, which is the document that collects the top level scientific requirements that need to be satisfied for us to successfully carry out the key Euclid science based on the weak lensing and galaxy clustering dark energy probes.

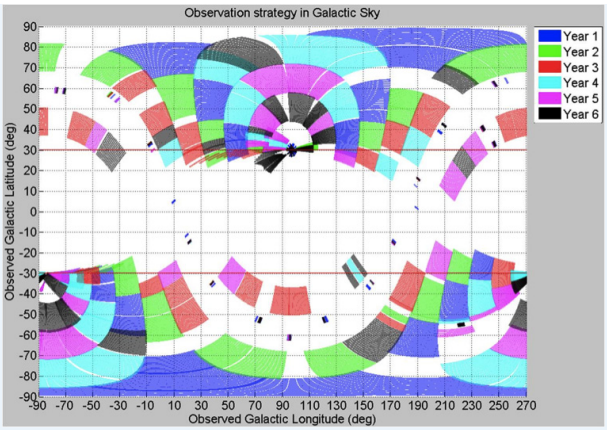
Survey updates

There have been two noteworthy changes of the survey situation with respect to the situation presented in the Red Book. One is related to hardware performances, the other implements a dedicated structure at mission level and participates to a joint Working Group (WG) with ESA.

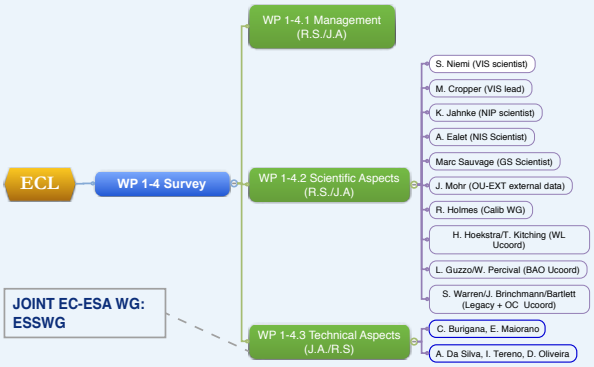
Updates of hardware performance values and operational times have increased the expected time to complete a full field of the wide survey (four dithers in specs) from ~4,000 sec up to ~4,500 sec. This nominally implies that a few more months are needed to cover the wanted areas at the new rate of ~19 fields/day (~9.5 sq deg/day). The new values were used in building the reference survey at the end of 2011 (see the figure on the right). We recall, however, that the situation will develop further because of ongoing reassessment of calibrations and their synergy with the newly formed calibrations group, of expected changes in performances and changes in constraints (Solar Angle Aspect and roll angles), and of the results of an optimization phase, which has just begun.

The other novelty is the creation of a specific Euclid Consortium Survey Working Group (ECSWG), which now appears as Work Package (WP) 1-4 in the Euclid Consortium Lead support area. The creation of such a WG clarifies the need for more resources and makes it possible to achieve a formal allocation of resources, it also provides a more structured approach to the survey planning.

This WP comprises two main branches. One deals with the actual software tools for detailed optimization of scenarios and is the Euclid Consortium (EC) link to a new joint Survey WG with ESA the Euclid Sky Survey Working Group (ESSWG). The recent new member, Portugal, has added new resources and skills to this particular area, adding to the ones already and actively present. The other branch comprises most of the EC people whose responsibilities directly link to the survey and will act to both suggest scenarios to be examined in detail and as to discuss the results from detailed implementations. All these activities have started and are actively pursued.



The reference survey as of end 2011. The different colours indicate at what stage in the survey that region of sky will be observed. The smaller regions at low Galactic latitude are calibration fields of various kinds.



How the new survey group fits into the overall organisational structure of Euclid.

Roberto Scaramella & Jerome Amiaux

What is happening in the coming months & years

June 2012	Adoption of the mission (SPC meeting 19-20 June).
June 26-27	OU-NIR Kick-off meeting in Rome
June 29	SGS System Team meeting in Toulouse
9-10 July 2012	OU-SIM and Cosmological Simulation SWG joint meeting in Barcelona.
July 2012	Invitation to tender for payload module (PLM) - the telescope is the most important part of this module.
November 2012	Kick-off for PLM contract.
December 2012	Invitation to tender for System and Service Module (SVM). This is the module that provides power and control to the satellite.
May-June 2013	Euclid consortium meeting.
June 2013	Kick-off for the SVM contract.
October 2013	System requirements review.
Q1 2014	Instrument Preliminary Design Review (PDR)?
Q4 2019	Launch.

For more information see the Euclid calendar on the internal Euclid Consortium website:
http://internal.euclid-ec.org/

Contact list

Euclid Consortium Lead	Yannick Mellier	mellier@iap.fr
ESA Study Scientist	René Laureijs	rlaureij@rssd.esa.int
ESA Project Manager	Giuseppe Racca	Giuseppe.Racca@esa.int
Mission Survey Scientist	Roberto Scaramella	kosmobob@oa-roma.inaf.it
Mission Survey Implementation Lead and Mission System Engineer	Jerome Amiaux	jerome.amiaux@cea.fr
EC Ground Segment Manager	Fabio Pasian	pasian@oats.inaf.it
EC Ground Segment Scientist	Marc Sauvage	marc.sauvage@cea.fr
EC Ground Segment System Lead	Christophe Dabin	Christophe.Dabin@cnes.fr
VIS Project Manager	Richard Cole	richard.cole@mssl.ucl.ac.uk
VIS Instrument Scientist	Mark Cropper	msc@mssl.ucl.ac.uk
NISP Project Manager	Thierry Maciaszek	thierry.maciaszek@oamp.fr
NISP Instrument Scientists	Knud Jahnke	jahnke@mpia.de
	Anne Ealet	ealet@cppm.in2p3.fr
Calibration WG Lead	Rory Holmes	holmes@mpia.de
Communication Leads	Bob Nichol	bob.nichol@port.ac.uk
EPO Scientist	Anais Rassat	anais.rassat@epfl.ch
SWG Cosmology Coordinators	Henk Hoekstra	hoekstra@strw.leidenuniv.nl
	Tom Kitching	tdk@roe.ac.uk
	Luigi Guzzo	luigi.guzzo@brera.inaf.it
	Will Percival	will.percival@port.ac.uk
SWG Legacy Coordinators	Stephen Warren	s.j.warren@imperial.ac.uk
	Jarle Brinchmann	jarle@strw.leidenuniv.nl
	Jim Bartlett	bartlett@apc.univ-paris7.fr

The Organisational Units

OU-VIS - Visual imaging	
Henry McCracken	**hjmcc@iap.fr**
Catherine Grenet	grenet@iap.fr
Kevin Benson	kmb@mssl.ucl.ac.uk
OU-NIR - Near-IR imaging	
Andrea Grazian	**grazian@oa-roma.inaf.it**
Rychard Bouwens	bouwens@strw.leidenuniv.nl
OU-SIR - Near-IR spectroscopy	
Marco Scodeggio	**marcos@lambrate.inaf.it**
Christian Surace	christian.surace@oamp.fr
OU-SPE - Spectroscopic measurements	
Olivier Le Fèvre	**Olivier.LeFevre@oamp.fr**
Marco Mignoli	marco.mignoli@oabo.inaf.it
OU-EXT - Data external to Euclid	
Gijs Verdoes-Kleijn	**verdoes@astro.rug.nl**
Joe Mohr	**jmohr@usm.lmu.de**

OU-SIM - Simulations of Euclid data	
Santiago Serrano	**serrano@ieec.uab.es**
Anne Ealet	ealet@cppm.in2p3.fr
OU-MER - Merging of external and Euclid data	
Adriano Fontana	**adriano.fontana@oa-roma.inaf.it**
Marian Douspis	marian.douspis@ias.u-psud.fr
Johannes Koppenhöfer	koppenh@mpe.mpg.de
OU-LE3 - Level 3 data	
Jean-Luc Starck	**jstarck@cea.fr**
Stefano Borgani	borgani@ts.astro.it
Filipe Abdalla	fba@star.ucl.ac.uk
OU-SHE - Shear measurements	
Andy Taylor	**ant@roe.ac.uk**
Frédéric Courbin	frederic.courbin@epfl.ch
Tim Schrabback	schrabba@astro.uni-bonn.de
OU-PHZ - Photometric redshifts	
Stephane Paltani	**stephane.paltani@unige.ch**
Francesco Castander	fjc@ieec.uab.es

The OUs design the algorithms that will be incorporated into the official pipeline by the SDCs The OUs are related to the science working groups who set the science requirements for their work - for that reason it is expected that most scientists will contribute to both the OUs and the SWGs. If you want to contribute to an OU, or if you want to know better what they do you should contact the coordinator(s) - the main lead is indicated with a bold typeface in the table above.

The Science Working Groups

Weak lensing SWG	
Henk Hoekstra	hoekstra@strw.leidenuniv.nl
Tom Kitching	tdk@roe.ac.uk
Karim Benabed (dpty)	benabed@iap.fr
Galaxy clustering SWG	
Luigi Guzzo	luigi.guzzo@brera.inaf.it
Will Percival	will.percival@port.ac.uk
Galaxy & AGN evolution SWG	
Andrea Cimatti	a.cimatti@unibo.it
David Elbaz	delbaz@cea.fr
Jarle Brinchmann	jarle@strw.leidenuniv.nl
Milky Way and Resolved Stellar Populations SWG	
Amina Helmi	ahelmi@astro.rug.nl
Mike Irwin	mike@ast.cam.ac.uk
Local Universe SWG	
Bianca Poggianti	bianca.poggianti@oapd.inaf.it
Stephen Warren	s.j.warren@imperial.ac.uk
Clustering SWG	
Jochen Weller	jochen.weller@usm.lmu.de
Lauro Moscardini	lauro.moscardini@unibo.it
Jim Bartlett (dpty)	bartlett@apc.univ-paris7.fr
CMB Cross-correlations SWG	
Carlo Baccigalupi	bacci@sissa.it
Nabila Aghanim	nabila.aghanim@ias.u-psud.fr

Extrasolar planets SWG	
Jean-Philippe Beaulieu	beaulieu@iap.fr
Maria Zapatero-Osorio	mosorio@iac.es
Eamonn Kerins (dpty)	eamonn.kerins@manchester.ac.uk
SNe and Transients SWG	
Charling Tao	tao@cppm.in2p3.fr
Isobel Hook	imh@astro.ox.ac.uk
Enrico Cappellaro (dpty)	enrico.cappellaro@oapd.inaf.it
Cosmological Simulations SWG	
Pablo Fosalba	fosalba@ieec.uab.es
Romain Teyssier	romain.teyssier@cea.fr
Primeval Universe SWG	
Jean-Gabriel Cuby	jean-gabriel.cuby@oamp.fr
Johan Fynbo	jfynbo@dark-cosmology.dk
Strong lensing SWG	
Jean-Paul Kneib	jean-paul.kneib@oamp.fr
Massimo Meneghetti	massimo.meneghetti@oabo.inaf.it
Cosmological Theory SWG	
Luca Amendola	l.amendola@thphys.uni-heidelberg.de
Martin Kunz	Martin.Kunz@unige.ch

The science working groups are where scientific preparations for Euclid is done and where science projects using Euclid data will be organised and carried out. They are also responsible for setting the scientific requirements that the mission must fulfil. These tasks run throughout the mission.

Each SWG is coordinated by a set of coordinators possibly including a deputy - these are listed above. If you wish to join one of the SWGs, you should contact the people listed for the relevant SWG. The SWGs themselves are coordinated by a group of seven science coordinators, see the table on the preceding page.