



MW-Gaia: Revealing the Milky Way with Gaia



Action Strategy

Deliverable D1





MW-Gaia will help maximize the scientific exploitation of ESA Gaia data

Research Coordination Objectives

1. Develop a research coordination framework to advance the study of the Milky Way.
2. Develop a research coordination framework to promote best practice in determining the most precise astrophysical parameters for stars and planets within our Milky Way.
3. Implement an Inclusion and Impact Plan to both ensure the implementation of best practice gender and inclusion policies across network activities.
4. Provide a Forum to transfer best practice in use of new computational techniques: in Big Data, Virtual Observatory, data mining, visualisation and astro-statistical techniques, and the development of high throughput statistical applications required in the analysis of Gaia data.





The MW-Gaia Action: Overview

Capacity Building Objectives

1. Deliver a European research agenda supporting the development of new approaches to the study of the Milky Way.
2. Enhance knowledge exchange between European research institutes to advance knowledge of the stellar component of our Galaxy.
3. Promote the development of a European research agenda maximizing the potential of astrometry of Gaia in the discovery and parameterization of solar and extrasolar systems.
4. Seed the networking of European expertise in developing new probes of fundamental physics.
5. Drive the development of an Action roadmap targeted at advancing the next generation of space astrometry missions.





Benefit of the MW-Gaia COST Network

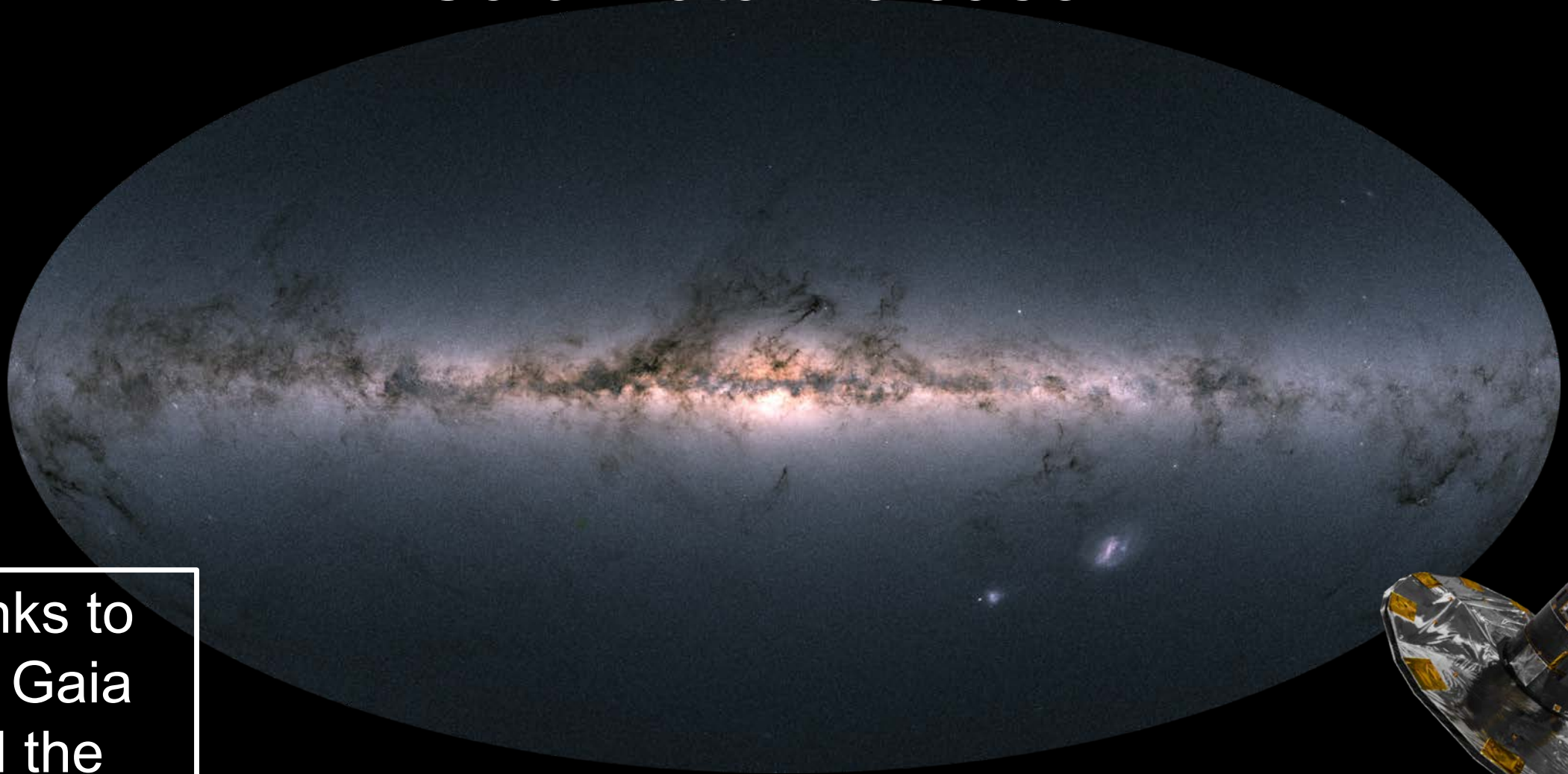
Lead not follow, raise profile of Gaia related science

- Increased science visibility and exposure of Gaia key science
 - Build connections across all of Europe (including central and eastern)
- Opportunities for (especially early stage) researcher networking and 'raising awareness' of their science
 - Training that supplements 'traditional' national PhD research
- Development of further competitive proposals to enable research in key science areas (e.g. near field cosmology)
 - E.g. Horizon Europe ERCs, national grants, RS fellowships etc
- Influence instrumentation projects deriving from network initiatives
- Support development of future major space missions (e.g. ESA voyage 2050 programme) → position industry participation in eventual build phase



MW-Gaia Background

Gaia Data Release 2



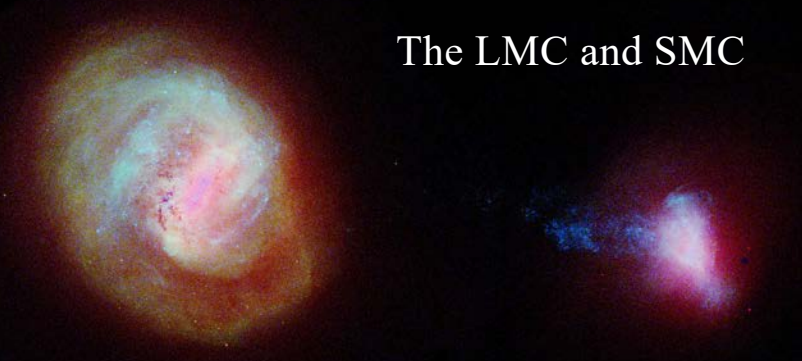
Thanks to
ESA Gaia
and the
DPAC

Gaia: a Big Science, Big Data Challenge

Gaia data leads to insight across astronomy

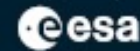


The LMC and SMC



Credit: ESA/
Gaia/ DPAC

Gaia EDR3: with larger to come



1 811 709 771
stellar positions

1 806 254 432
brightness
in white light

1 542 033 472
brightness
in blue light

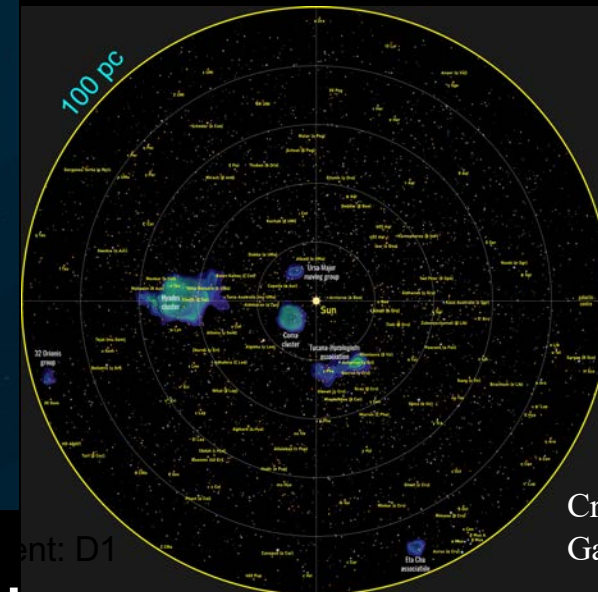
1 540 770 489
colour

1 467 744 818
parallax and
proper motions

1 614 173
extragalactic
sources

1 554 997 939
brightness
in red light

Mapping star
density out to
100pc



Credit: ESA/
Gaia/ DPAC



Over 1.7 Trillion observations, and counting ...



MW-Gaia: Building on existing heritage

MW-Gaia is an initiative of the Gaia Science team on behalf of the Gaia science community

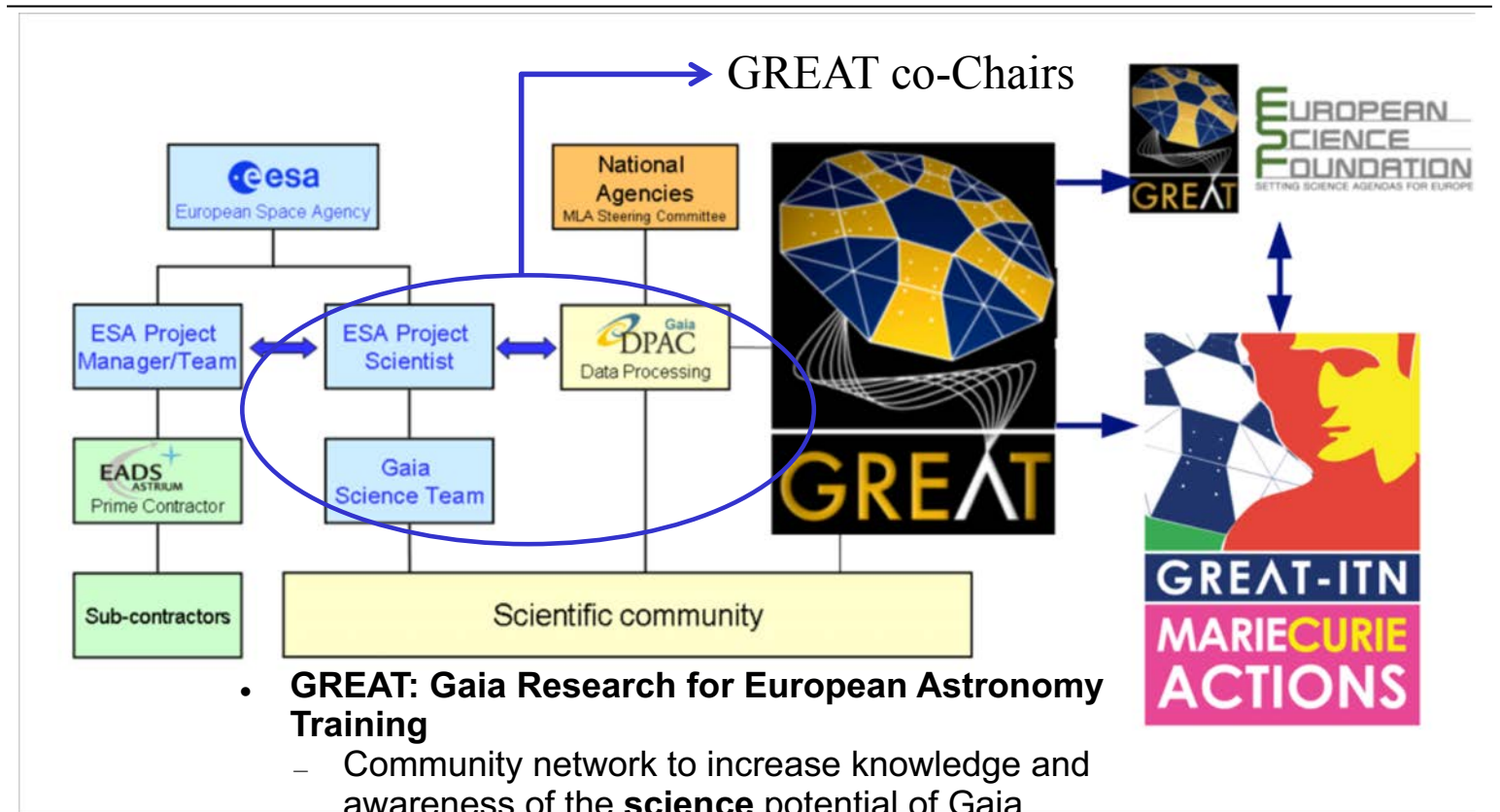
Builds on the GREAT network active since 2010

Earlier ESF RNP and EU ITN networks

2010-2015



GREAT: Gaia's science community



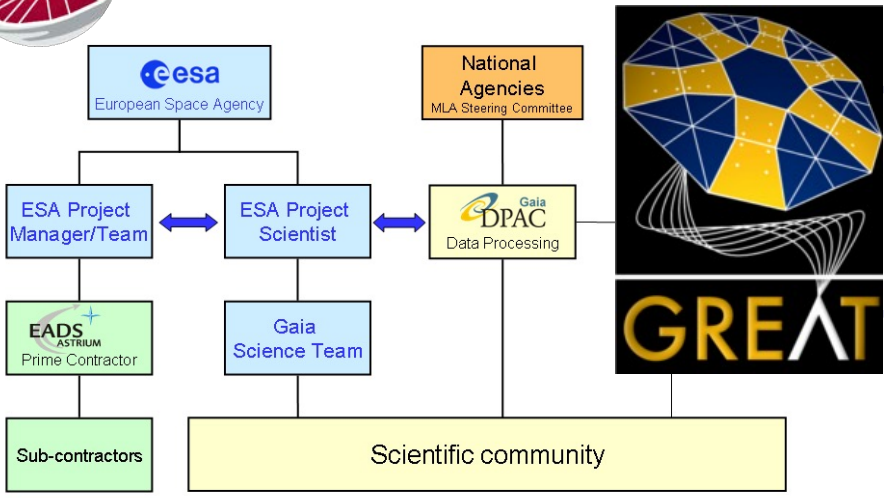
Gaia Research for European Astronomy Training

GREAT 2010-2015

Some history:

See <http://www.great-esf.eu>

over 2000 scientists attending ~60 events



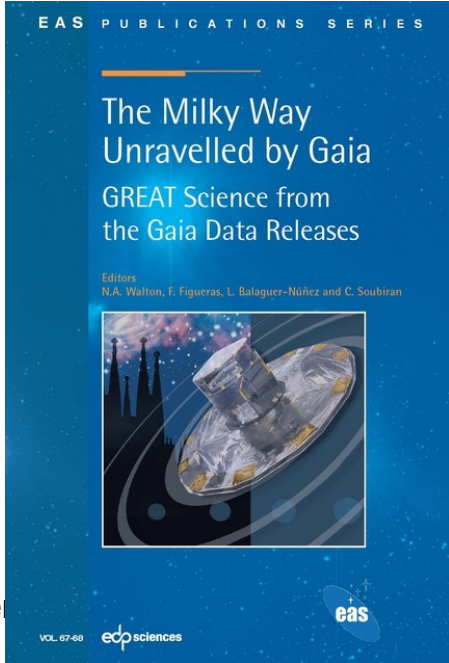
Workshops & Exchanges

Student Training
17 ESR/PhDs

Outputs: science teams, science case for new instruments, case for new networks



Gaia launched Dec 2013. 1st data release Sep 2016



Contractor	Contracted Item
EADS/Astrium Ltd	Electrical Service Module
Selex Systems	Spacecraft documentation, configuration, schedule support
e2v Technologies	
EADS/Astrium Ltd	ile & focal plane assembly structural
EADS/Astrium Ltd	ing unit
MSSL	sembly: CCD/Proximity electronics module coupling
EADS/Astrium Ltd	Chemical propulsion system
ABSL	Battery
Aerostanrew Ltd	Avionics model bench structure

Gaia & INDUSTRY (here UK example)



MW-Gaia: Building on GREAT-ESF

GREAT-ESF network ran Feb 2010 to Aug 2015 (budget €735K)

The network supported community proposed conferences, workshops, schools, and long and short exchange visits,

2280 scientists attended 3 conferences, 35 workshops, and 8 schools organised with support from the GREAT RNP, with, in addition, 79 exchange visits carried out.

A range of high impact research collaborations, research initiatives, publications, white papers, resulted, all aiding the future exploitation of the high value data from the ESA Gaia mission.



GREAT ESF RNP Scientific Community Building



- Involves over 100 groups in over 20 countries
 - The ESF RNP is supported by 16 funding agencies
 - <http://www.great-esf.eu> & <http://www.esf.org/great>
 - <https://lists.cam.ac.uk/mailman/listinfo/ast-great-announce>
- Key science remit inclusive across Gaia science
 - Origin, structure, evolution of the Milky Way
 - Stellar Astrophysics
 - Galactic Dynamics
 - Galactic Archaeology
 - Star formation and evolution
 - Fundamental physics
 - Extra solar planets
 - Solar system
 - The IT data challenge





MW-Gaia: Building on GREAT-ITN

The GREAT-ITN: Mar 11 – Feb 15

<http://www.great-itn.eu>



ITN network ran Mar 2011 to Feb 2015 (budget €4250K)

A range of high impact research collaborations, research initiatives, publications, white papers, resulted, all aiding the future exploitation of the high value data from the ESA Gaia mission.

Trained 17 PhD students across 14 Institutes



Nearly all the GREAT-ITN students + plus some supervisors – meet them at this conference



1 December 2014

Walton - GREAT-ITN @ Barcelona

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Training: The Art of Observations Tenerife



1 December 2014

Walton - GREAT-ITN @ Barcelona

17



1 December 2014

Walton - GREAT-ITN @ Barcelona

18



Training: Galaxy Modelling Besançon



1 December 2014

Walton - GREAT-ITN @ Barcelona

18



Training: Visualisation LSST@Seattle / Microsoft@Redmond



1 December 2014

Walton - GREAT-ITN @ Barcelona

17



1 December 2014

Walton - GREAT-ITN @ Barcelona

18



<https://www.flickr.com/search/?w=8697001@N06&q=GREAT>

1 December 2014

Walton - GREAT-ITN @ Barcelona

19







MW-Gaia: Looking Ahead

- Science training via exchange visits
- Generating key new initiatives as outcomes of topical workshops
- Workshops to support exploitation of Gaia data: e.g. ground based survey planning, development of computational techniques, synergies with other missions.
- Bring together the expert community to provide input into the science development underpinning the case for next generation astrometry → towards sub microarcsec astrometry and/or into the infrared.





COST Scientific Committee Comments

1. the level of involvement of Inclusiveness Target Countries (ITCs) should be increased and a plan should be developed and implemented to ensure the full involvement of ITC representatives in all aspects of the Action's implementation (including in Action leadership positions)
2. the level of involvement of Early Career Investigators (ECIs) should be increased and a plan should be developed and implemented to ensure the full involvement of ECIs in all aspects of the Action's implementation (including in Action leadership positions)
3. the gender balance should be improved and a plan should be developed and implemented to ensure gender balance in all aspects of the Action's implementation (including in Action leadership positions).





Responding to the Scientific Committee Comments

1. involvement of Inclusiveness Target Countries (ITCs)
 - ITCs in Core Group
 - Meetings in ITC countries
 - Action Website – focus on ITC / role models
2. involvement of Early Career Investigators (ECIs)
 - WG Task leads: ECIs
 - ECIs as members of workshop SOCs
 - Action Website – focus on ECIs / role models
3. the gender balance should be improved
 - Gender balance of leadership positions in Core Group
 - Balance on STSMs and Balance on meetings organising committees





Action Management Procedures

See: [Guidelines for COST Action Management, Monitoring and Final Assessment](#)

MC majority votes

Most MC decisions by e-vote (has to be by email as COST do not (yet) have an electronic voting tool available).

If you don't vote – then that counts as a 'positive' vote!

Most MC decisions have to be signed off by the Science Officer

One face to face MC meeting per Grant Period

Operational management of the Action supported by the Core Group





The MW-Gaia Action: Working Groups

MW-Gaia is organized around FIVE Working Groups

WG1: The Milky Way as a Galaxy

WG2: The Life and Death of Stars

WG3: Planetary Systems Near and Far

WG4: Gaia Fundamentals: Space and Time

WG5: Impact, Inclusiveness and Outreach

Each WG has six deliverables as noted in the Action's MoU

The final reports from each WG1,2,3 support the key action deliverables

D4.6: Report: **CBO4**: Space and Time: current frontiers in the context of the Milky Way, and science priorities for next generation sub- μ as astrometry.

D5.6: Report: **CBO5**: The Milky Way Revealed by Gaia: The Next Frontier





Action Structure and Core Group

- Action Chair: Nicholas Walton (IoA, Cambridge, UK)
- Action Vice-Chair: Carme Jordi (UB, Barcelona, ES)
- WG1 Lead: Despina Hatzidimitriou (Athens, GR)
- WG2 Lead: Gisella Clementini (INAF-Bologna, IT)
- WG3 Lead: Joris De Ridder (Leuven, BE)
- WG4 Lead: Sonia Anton (Aveiro, PT) (ITC)
- WG5 Lead: Šarūnas Mikolaitis (Vinius, LT) (ITC)
- STSM Coordinator: Karri Muinonen (Helsinki, FI)
- TA: Ivanka Stateva (BAS, Sofia, BG) (ITC)
- ODM/SCM: Anthony Brown (Leiden, NL)
- ITM: Corinne Charbonnel (Geneva, CH)





MW-Gaia Action: Management Roles

- Currently 24 COST countries participating in the Action
 - Typically, 2 MC members per country
 - In addition, there will be MC Observers from the NNC participants
- Operational management of the network carried out by the Chair and Vice-Chair with the support and input of the Core Group
- Core Group Composition: 10 voting members plus Chair
 - Chair and Vice Chair (Note: Grant Holder rep = vice-Chair)
 - The five Working Group Leads
 - Short term science mission(STSM) Coordinator
 - Target Agent (TA)
 - Outreach and Science Dissemination (ODM/SCM) manager
 - Inclusion and Training (ITM) Manager





Implementation of Cost Policy

Geography: ITC

Aim to ensure full participation of participants from ITC COST countries

Location of meetings

MC Core Group roles (MC members are set by the countries themselves!!!)

STSM and WG activity

Age: Early Career Investigators

Aim to ensure full participation of ECI participants

SOC: Organisation of meetings

WG Task lead roles

STSM and WG activity

Gender Balance

Aim at Gender balance across Action activities and MC Core Group.





Deliverables and Timeline

MW-GAIA GANTT		Mths from Start	YEAR ONE (2019/20) GP1					YEAR TWO (2020/21) GP2					YEAR THREE (2021/22) GP3				YEAR FOUR (2022/23) GP4			
			1-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	33-35	36-38	39-41	42-44	45-47	48	
Deliverables indicated, milestones are the meetings, workshops, training schools.		nominal date	Mar-19	May-19	Aug-19	Nov-19	Feb-20	May-20	Aug-20	Nov-20	Feb-21	May-21	Aug-21	Nov-21	Feb-22	May-22	Aug-22	Nov-22	Feb-23	
TYPE	ACTION																			
MC	Mgt Committee Meeting		MC KO		MC GP1			MC GP2				MC GP3				MC GP4				
CG	Core Group Meeting			CG KO	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	telecons	
STSM	Exchange visit open call			CALL 1	CALL 2		CALL 3		CALL 4		CALL 5		CALL 6		CALL 7		CALL 8			
WG	WG Meeting		WG1 KO	WG2 KO			WG1 FM2	WG2 FM2								WG1 FM3	WG2 FM3			
			WG3 KO	WG4 KO			WG3 FM2	WG4 FM2	WG5 FM2							WG3 FM3	WG4 FM3			
			WG5 KO													WG5 FM3				
	WG Telecon				WG1 T1	WG2 T1		WG2 T2	WG1 T2		WG1 T3	WG2 T3	WG1 T4	WG2 T4				WG1 T5	WG2 T5	
					WG3 T1	WG4 T1		WG4 T2	WG3 T2		WG3 T3	WG4 T3	WG3 T4	WG4 T4				WG3 T5	WG4 T5	
					WG5 T1		WG5 T2				WG5 T3		WG5 T4					WG5 T5		
DISSEMINATION	Outreach event		Website								SA Schools	Outreach at IAU GA								
SCHOOL	Action Training Schools				D1.1			D2.1	D5.1		D3.1				D4.1					
WORKSHOP	WG Workshops			D1.2 WG1	D2.2 WG2			D3.3 WG3	D2.3 WG2	D5.3 WG5	D1.4 WG1	D2.4 WG2	D3.4 WG3		D1.5 WG1	D2.5 WG2				
				D3.2 WG3	D4.2 WG4			D1.3 WG1	D4.3 WG4		D5.4 WG5	D4.4 WG4			D3.5 WG3	D4.5 WG4				
								D5.2 WG5												
CONFERENCE																		D5.5 WG5		
REPORTS	Reports and Documents			Action Strategy Document				Action Yr1 Report				Action Period 1 Report				Action Yr 3 Report			D5.6 Roadmap / Action P2 Report	
EXTERNAL	Gaia Data Releases							GEDR3					GDR3							
	IAU General Assembly												IAU GA							
	EAS EWASS			EWASS2019				EWASS2020				EWASS2021				EWASS2022				
naw	v20190314 - MC KO	KEY:	FM# = Full Meeting	T# = Telecon meeting	WG KO = Working Group Kick Off Meeting	D# = Deliverable (colour coded by WG, see section 3.1.1)														





Deliverables and Timeline

- Schedule revision w.r.t. original proposal
 - Because funds can not be carried over from Grant Period to Grant Period
 - Move all meetings to the months June to January. This provides time to ensure funds are spent before the end of the GP (30 April).
- Action deliverables as per the original proposal
 - Main deliverables are reports on outcomes of the Activity meetings.
 - One WG5 workshop (Impact Workshop Yr1: Tech challenges for space-based astrometry, an industry forum) moved to start of GP2 (May 2020).





Deliverables and Timeline

- MOU D1: M6: Action Strategy Document describing the key aims and objectives of the Action
- MOU D2: M15: Action year 1 report including reports of all Action activities carried out in months 1-12
- MOU D3: M27: Action Period 1 report including reports of all Action activities carried out in months 1-24
- MOU D4: M39: Action year 3 report including reports of all Action activities carried out in months 24-36
- MOU D5: M48: Action Period 2 report including reports of all Action activities carried out in months 25-48
- MOU D6: M48: MW-Gaia Roadmap report: The Milky Way Revealed by Gaia: The Next Frontier





12: GP1 Implementation Planning

Grant Period 1

Activity planning (Work Plan preparation)

STSM Call – aim to issue by 1 May 2019

Workshop setups and decide on who gets the invites to each

Budget planning (Budget Plan preparation)

Agree initial budget for GP1

Dissemination strategy/ planning (Publications and outreach activities)

Website : <http://www-mw-gaia.eu>

GP1 procedures

Invites to meetings – prioritise ECI/PhD attendees (ITC secondary) / take into account Gender balance





GP1 Implementation Planning

Grant Period 1

Grant Period Goals, WG tasks and deliverables

MOU D1: M6: Action Strategy Document describing the key aims and objectives of the Action

General: Each WG establish membership, WG-L set here. Deputy leads and Task leaders. Schedule for WG telecons

WG1: Meeting organisation: Cambridge (UK) and Barcelona (ES)

WG2: Meeting organisation: Zagreb (HR)

WG3: Meeting organisation: Porto (PT)

WG4: Meeting organisation: Nice (FR)

