Version 2015-06-12

COST Action number ES1309
(25/04/2014– 24/04/2018)

Innovative optical Tools for proximal sensing of ecophysiological processes (OPTIMISE)

PROGRESS REPORT 1/2
(25/04/2014– 12/02/2016)

This report is submitted by the MC Chair on behalf of the Management Committee and is validated by the Scientific Committee of the COST Association.

Confidentiality: the document will be made available to the public via the Action page on the COST website except for Section II.D.

Executive summary of the Progress Report:

A start has been made towards achieving the main Aim of this Action: a spectral data and information storage and sharing system (SPECCHIO) has been adapted and successfully trialled – a milestone. However, further development work and tests require to be carried to adapt it to storing 3D data (georefreneced images) and adapt it for ecosystem-specific applications; trial flights of one spectrometer/unmanned aerial vehicle (UAV) system, and two imaging/UAV systems were successfully carried out during the SWAMP training school. However, at least one other innovative and high quality spectrometer systems remains to be tested on UAVs. The system has been ground-tested and offers a significant technological advancement. This system will offer a significant improvement in data quality and flexability of application. A wirelss communication system has been tested locally but is still to be deployed and tested in the field. More progress has been made with the reflectance and fluorescence aspects of the Action and a major publication is currently under review. ESRs have been actively encouraged to participate in the Action management, five of the eleven core group members are ESRs. Each working group has held a themed workshop and dissemination activities have progressed: additional content has recently been included (STSM Report and Training School Science Reports) on the the OPTIMISE website and the first OPTIMISE Newsletter has been published.

A major success for the OPTIMISE network has been the announcement by the Eurpean Space Agency that the Fluorescence Explorer (FLEX) concept has been selected as the next Earth Explorer mission, with a launch scheduled for 2022. The work of COST Action ES1309 'OPTIMISE' was explicately cited in the report submitted to ESA (ESA, 2015). Many of the OPTIMISE network are actively invlolved in FLEX and in the establishment of a ground validation network for the space-base observations of photosynthesis fluorescence, a more direct measure of vegetation health and primary productivity. During training schools and practical workshops the next generation of environmental scientists (PhD students and ESRs) are being specifically trained to build future capacity to utilise this exciting development in Earth observation for global monitoring and environment and security (GMES).

Inclusiveness countries: Cyprus; Czech Republic; Estonia, Croatia; Hungary; Portugal; Bulgaria; Turkey; and Estonia have joind the Action and actively participate in meetings and training schools. In fact the second OPTIMISE training school 'SWAMP' was held in Poland and a Polish MC substitute member is the Traning Leader for the Action. A NNC institute has now joined the Action and a member from that institute participated in a meeting and in a training school.

Through holding a joint training school with EUFAR maxim resource utilisation and information dissemination was achieved. OPTIMISE funded trainees received exposure to a far greater range of trainers and resources (ESA held a concurrent field campaign) than would have been possible from the OPTIMISE budget and a greater number and more diverse selection of ESRs, and more senior researchers as trainers, engaged in this activity that would have been possible in an OPTIMISE only training school. See online responses Q8 Additional remarks https://www.surveymonkey.com/results/SM-VJDZGDM2/# for trainee's view of the course.

Reference: ESA (2015). Report for Mission Selection: FLEX, ESA SP-1330/2 (2 volume series), European Space Agency, Noordwijk, The Netherlands.

Summary assessment of Progress Review by Action Rapporteur:	
(max.500 words) (to be transferred by SO from Action Rapporteur report) SO enters Action Rapporteur 500 word summary here. SO enters Action Rapporteur	
Action Rapporteur	Name Institution Country

Validation by Scientific Committee
This report was validated by the Scientific Committee on: <insert date of SC validation>

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I. Progress Report

I.A. COST Action Profile

Objective/ Aim
The aim of the Action is to promote reflectance and fluorescence measurements of ecosystems as ground validation networks for Earth system models and global satellite observations, using innovative spectrometer and UAV platforms, and develop automated wireless communication systems with on-line spectral information storage, quality assurance and data product sharing portals

Details			
MoU:	056/13	Start of Action:	25/04/2014
CSO approval date:	15/11/2013	End of Action:	24/04/2018

COST Member Countries and Cooperating State having accepted the MoU

Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Israel; Italy; Latvia; Netherlands; Norway; Poland; Portugal; Romania; Spain; Sweden; Switzerland; Turkey; United Kingdom.

Intentions to Accept the MoU

0"

Other participants:

Institution Name	Country
Scientific Centre for Aerospace Research of the Earth, Institute of Geological Science, NASU	Ukraine
University of Wisconsin-Madison	USA
University of Alberta	Canada
European Space Agency (pending)	Europe
University of Tasmania (in progress)	Australia

Contacts

Chair/ Vice Chair

Position	Name	Contact details	Country	Date of PhD:	Gender
Chair:	Dr Alasdair Mac Arthur	University of Edinburgh Grant Institute, Kings Buildings, University of EdinburghEH9 3JW Edinburgh United Kingdom alasdair.macarthur@ed.ac.uk	UK	2012	M
Vice Chair:	Dr Micol Rossini	Remote Sensing of Environmental Dynamics Laboratory, DISAT, Universit degli Studi Milano-Bicocca piazza della Scienza, 120126 Milano Italy. micol.rossini@unimib.it	Italy	2006	F

Working Group Leaders

WG#	WG Title	WG Leader	Country	Date of PhD:	Gender	Number of participants
1	WG1 – Spectral Information System	Dr Andrea Hueni	Switzerland	2011	M	21
2	WG2 – Unmanned Aerial Vehicles	Dr Enrico Tomelleri	Germany	2007	M	29
3	WG3 – Reflectance and Fluorescence	Prof. Christiaan van der Tol	Netherlands	2007	M	29

Other positions if applicable (STSM Coordinator, WG Vice Leader, Task Force Leader…)

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Position	Name	Country	Date of PhD:	Gender
Training Leader	Dr Radosław Juszczak	Poland	2004	M
Dissemination Leader	Dr Albert Porcar	Finland	2008	M
MEG Leader	Dr Loris Vescovo	Italy	2004	M
WG 1 co-coordinator	Mr Helge Assen	Germany	Not yet submitted	M
WG 2 co-coordinator	Dr Andreas Burkart	Germany	2015	M
WG 3 co-coordinator	Dr Maria-Pilar Cendrero	Germany	2014	F

Action website:	http://optimise.dcs.aber.ac.uk/

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I.B. Progress with MoU objectives and deliverables and additional outputs

MoU objectives

MoU objective	Achieved Yes/ Partially/ No	Evidence of (partial) achievement including hyperlink to enable assessment of the achievement[1]. Justification if full achievement is not foreseen
Support the ICOS network, bringing together EC scientists and the proximal sensing community, in order to enhance and enlarge the global spectral sampling network	Partly	Prof. Christiaan van der Tol gave a OPTIMISE presentation in ICOS Finland during 2014 where (Werner Kutsch, ICOS Director, was also present). Link: http://www.icos-infrastructure.fi/?q=node/20 An ICOS-OPTIMISE discussion was held during the workshop in Madrid March 2015. See agenda http://optimise.dcs.aber.ac.uk/workshops-meetings/madrid-workshops-mc-meeting-2015/
Harmonize instruments and measurement protocols to be adopted, across different ecosystems	Not yet	
Promote the use of a common 'smart' on-line spectral information system to share standardized proximal sensing data and products with other scientific communities (FLUXNET, ICOS, FLEX)	Partly	Open floor discussion held during WG1 workshop Madrid, March 2015. See agenda http://optimise.dcs.aber.ac.uk/workshops-meetings/madrid-workshops-mc-meeting-2015/
Develop a framework in the on-line system for consolidated metadata for specific ecosystem types and applications	Not yet	
Bridge the gap between in-situ measurements and satellite sensor data by promoting the development and use of UAV-based observation and their integration with modelling approaches for monitoring and investigating ecosystem functioning across differing temporal and spatial scales, leading to the better exploitation of satellite data	Partly	Trial during SWAMP training school Poland July, 2015 See Group Reports http://optimise.dcs.aber.ac.uk/training-schools/the-6th-eufar-optimise-training-course-on-spectrometry-of-a-wetland-and-modelling-of-photosynthesis-with-hyperspectral-airborne-reflectance-and-fluorescence/
Support the RS activities focused on steady-state fluorescence and the Fluorescence Explorer (FLEX) mission, promoting, coordinating, and disseminating the results of validation and calibrations campaigns	Partly	Trials and field work conducted during SWAMP training school Poland July, 2015 and data sets made available via SPECCIO spectral information system. http://specchio.ch/campaign_overview.php

MoU deliverables

[1] The links to the outputs and deliverables will be used by the Action Rapporteur in assessing the progress.

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MoU deliverable	Level of progress [1]	Evidence of (partial) delivery achievement including hyperlink to enable assessment of the delivery[1]. Justification if full achievement is not foreseen
WG1:		
Definition of a mandatory metadata set, aligned with current international efforts in the spectroscopy community	Not yet	
Develop an on-line instance of a spectral information database to serve as demonstration and testing platform for data sharing and information building	Partly	Data sets from SWAMP training school Poland July, 2015 made available via SPECCIO spectral information system. http://specchio.ch/campaign_overview.php
Develop a wireless automated dataflow from in-situ and UAV sensor for the database system	Partly	Field trials of prototype system initiated
Definition and implementation of data pre-processing and metadata augmentation algorithms and routines including quality checks and flagging and data assimilation	Partly	Trial data sets developed during SWAMP training school Poland July, 2015 made available via SPECCIO spectral information system. http://specchio.ch/campaign_overview.php
Definition and implementation of system interfaces and algorithms for data retrieval allowing the building of products using sources such as biogeochemical modelling, flux data specialisation and space-sensed data	Partly	Trial data sets developed during SWAMP training school Poland July, 2015 made available via SPECCIO spectral information system. http://specchio.ch/campaign_overview.php
WG2		
Review and report on the challenges for optical sensing in up-scaling biophysical properties of vegetation and test different UAV platform/measurement instruments setups	Partly	Approaches for linking ground and remote sensing approaches are being explored. Imaging spectrometer acquisitions have been used for retrieving biophysical parameters through inversion of RTM models. The ARTMO toolbox (Verelst et al. http://ipl.uv.es/artmo/) has been tested for this purpose during the SWAMP summer school. See programme at
Development of a footprint tool for	Not yet	Currently the footprint must be characterized. At the moment no specific tool is available.

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optimal placement of fixed spectrometers and for combination of EC measurements with UAV-based spectral data		
Liaise with industry representatives to improve accuracy of GPS	Partly	The advantage of combining GPS and GLONASS has been tested in cooperation with UAV producers (e.g. Soleon s.r.l). An online system for real-time GPS correction is not being tested. We tested that differential correction of ground control points is necessary for matching time series of UAV borne measurements.
Definition of new methods for scaling up functional relationships between optical properties and ecosystem processes from in-situ to landscape scale by means of UAVs, including identification of adequate radiative transfer models to be coupled with biogeochemical models for linking biogeophysical properties of vegetation with its optical properties	Partly	An imaging spectrometer and a hyperspectral camera have been used for characterizing the footprint area of test sites in the North Eastern Alps and in Poland from UAV. i) Thermal data are currently being used for ET modelling and ii) hyperspectral data for retrieving biophysical parameters. The preliminary results of i) will be presented to AGU 2016 (Castelli et al.) and preliminary results of ii) have been presented to EARSEL 2015 (Tomelleri et al. 2014 http://www.earsel2015.com/fileadmin/user_upload/Program_short.pdf). Further developments will be presented to the next ESA living planet conference.
WG3		
Review and report on the methods and instruments used to estimate the solar-induced fluorescence from passive remote measurements	Partly	A questionnaire has been carried out among the working group members out the methods that are currently used. https://drive.google.com/file/d/0B3SaimDgRZM1MWd6eFNTbnVxMW8 Measurement protocols have been practised at the training schools. This will result in defined best practise protocols in the final stage of the project (see next deliverable).
Definition of the technical requirements and acquisition protocols for reflectance and fluorescence measurements from UAV and ground-based instruments	Not yet	
Database of reflectance, fluorescence and productivity data for later use in models and applications	Not yet	
Integration of ground and UAV measurements with biochemical model	Partly	Two training schools in which both datasets have been collected: http://optimise.dcs.aber.ac.uk/wp-content/uploads/OPTIMISE-Newsletter1.pdf

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outputs to better understand the links between photosynthesis, plant stress, growth and physiology with the temporal dynamics of reflectance and fluorescence		One online course on model-data integration for reflectance and transmittance: https://canvas.instructure.com/courses/993194/assignments/syllabus

Co-authored publications and FP7/ H2020 proposals

The co-authored publications and FP7/ H2020 proposals/ projects resulting from the Action are listed on the page following the "Additional outputs and achievements" section

Additional outputs and achievements

Please describe any other outputs and achievements that have resulted or are in progress, focusing in particular on those that contribute to the COST mission of "COST enables break-through scientific developments leading to new concepts and products and thereby contributes to strengthen Europe's research and innovation capacities."
• A prototype of a hyperspectral sunphotometer for the validation of Sentinel-2 and 3 and FLEX observations have been developed and will be field trialled during a STSM in March 2016. This work will be presented at the ESA Living Planet workshop in Prague 2016. • Collaborations with DLR for the calibration and validation of Sentinel-2 observations has been initiated. This project will uniquely use ground reflectances, as well as atmospheric soundings to validate Sentinel-2 observations. • OPTIMISE members: Moreno; Rascher; Rossini; van der Tol; Damm; Magnani; Alonso; Cendrero-Mateo; Sabate; Verrelst; and Mac Arthur participated in the FLEX-Bridge project. FLEX is the ESA EE8 mission to measure photosynthesis fluorescence from space recently approved by the ESA board and with the intention to launce in 2022. The goal of the FLEX Bridge Study was to optimize approaches for SIF retrievals and applications in the assessment of photosynthesis and stress status in terrestrial vegetation, including the development of a calibration/validation strategy for FLEX products. See http://www.flex-photosyn.ca/FB_AboutFB.htm. This work directly furthers the aims of OPTIMISE

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Co-authored publications and FP7/ H2020 proposals

Co-authored publications

Enter in the table below only publications on the topic of the Action, co-authored by at least two Action participants from two different countries participating in the Action and for which the Action networking added value. A maximum of ten publications may be entered. If the Action has more than ten such publications the Core Group should select the ten most significant ones to include in the table below.

NO.	Bibliographic data (including: Title, Authors, Title of the periodical or the series, Issue number or volume, Publisher, Year of publication, Relevant pages)	Main author	Number of authors	Action participants listed among the authors (Name, country and role[2])	WGs involved in publication	Date of submission (must be after Action start date)	Expected date of publication (if not already published)	Persistent link to publicly available version of the paper (if available) or the abstract	Is/Will open access[3] provided to this publication?	Is/ will COST be cited/ acknowledged in the publication?	Are/ will COST funds (be) implicated in this publication	Relevance to H2020 Societal Challenges[4]?	Is it peer-reviewed?	Was the added value of the Action Networking necessary for the publication	a
1	A. Porcar-Castell, A. Mac Arthur, M. Rossini, L. Eklundh, J. Pacheco-Labrador, K. Anderson, M. Balzarolo, M.P. Martin, H. Jin, E. Tomelleri, S. Cerasoli, K. Sakowska, A. Hueni, T. Julitta, C.J. Nichol, L. Vescovo (2015) EUROSPEC: at the interface between remote-sensing and ecosystem CO2 flux measurements in Europe	*A Porcar-Castell*	*16*	*Primary authors A. Porcar-Castell A Mac Arthur (All co-authors in OPTIMISE and contributed to the writing and editing of this review paper)*	*G1 WG2 WG3*	*3rd June 2015*	*Published*	*http://www.biogeosciences.net/12/6103/2015/bg-12-6103-2015.html*	*yes/no*	*YES. OPTIMISE is introduced in the review*	*Indirectly YES. The work was planned during OPTIMISE meetings*		*yes*	*yes*	3
2	Cendrero-Mateo, M.P., Moran. S., Papuga, S., Thorp, K., Alonso, L., Moreno, J., Ponce-Campos, G., Rascher, U., and Wang, G. (2015b) Plant chlorophyll fluorescence: active and passive measurements at canopy and leaf scales with different nitrogen treatments. Journal of Experimental Botany, doi:10.1093/jxb/erv456	*Cendrero-Mateo, M.P.,*	*9*	*1st author Cendrero-Mateo, M.P.,* Technical contribution Alonso, L., science contribution Moreno, J., & Rascher, U	*WG1, WG2 WG3*	*25th April 2015*	*Published*	*http://jxb.oxfordjournals.org/content/early/2015/10/18/jxb.erv456.full.pdf*	*yes*	*no*	*no*	*yes*	*yes*	*yes*	5
3	*Cendrero-Mateo, M.P., Carmo-Silva AE, Porcar-Castell A, Hamerlynck EP, Papuga SA, Moran MS. (2015a). Dynamic response of plant chlorophyll fluorescence to light, water and nutrient availability. Functional Plant Biology 42, 746–757.*	*Cendrero-Mateo, M.P.,*	*2*	*1st author Cendrero-Mateo, M.P., Contributing author Porcar-Castell A,*	*WG2 WG3*	*8th Jan. 2015*	*Published*	*http://dx.doi.org/10.1071/FP15002*	*yes*	*no*	*no*	*yes*	*yes*	*yes*	5
4	*Burkart A., Schickling A.; Pilar Cendrero Mateo M., Wrobel T.; Rossini M., Cogliati S., Julitta T. & Rascher, U. (2015) A method for uncertainty assessment of passive sun-induced chlorophyll fluorescence retrieval by using an infrared reference light. IEEE Sensors, 15, 4603-4611.*	*Burkart A.,*	*6*	*1st author Burkart A., contributing authors Cendrero Mateo M.P.,; Rossini M., Cogliati S., Julitta T. & Rascher, U*	*WG2 WG3*	*Aug. 2015*	*Published*	*http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7086007*	*yes*	*no*	*no*	*yes*	*yes*	*yes*	1
5	*Cogliati S., Rossini M. Julitta T.; Meroni, M. Schickling A., Burkart A., Pinto F., Rascher U. & Colombo R. (2015) Continuous and long-term measurements of reflectance*	*Cogliati S.,*		*Contributing authors*	*WG3*			*http://www.sciencedirect.com/science/article/pii/S0034425715001248*	*no*	*no*	*no*	*yes*	*yes*	*yes*	

[2] MC Member/ MC Substitute/ MC Observer/ WG Member/ Training School Trainee/ STSM Recipient/ Other Action Participant

[3] Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

[4] H2020 Societal Challenges are “Health, demographic change and wellbeing”; “Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy”; “Secure, clean and efficient energy”; “Smart, green and integrated transport”; “Climate action, environment, resource efficiency and raw materials”; “Europe in a changing world - inclusive, innovative and reflective societies”; “Secure societies - protecting freedom and security of Europe and its citizens”

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	and sun-induced chlorophyll fluorescence by using novel automated field spectroscopy systems. Remote Sensing of Environment, 164, 270-281.			*Rossini M. Julitta T.; A., Burkart Rascher U.*											
6	*Rascher U., Alonso L., Burkart A., Cilia C., Cogliati S., Colombo R., Damm A., Drusch M., Guanter L., Hanus J., Hyvärinen T., Julitta T., Jussila J., Kataja K., Kokkalis P., Kraft S., Kraska T., Matveeva M., Moreno J., Muller O., Panigada C., Pikl M., Pinto F., Prey L., Pude R., Rossini M., Schickling A., Schurr U., Schüttemeyer D., Verrelst J. & Zemek F. (2015) Sun-induced fluorescence - a new probe of photosynthesis: First maps from the imaging spectrometer HyPlant. Global Change Biology; doi: 10.1111/gcb.13017.*	*Rascher U.*	*8*	*1st author Rascher U., Contributing authors Alonso L., Burkart A., Damm A.,., Julitta T.,., Moreno J., Rossini M., Verrelst J..*	*WG2 WG3*	*23rd Sept. 2015*		*http://onlinelibrary.wiley.com/doi/10.1111/gcb.13017/full*	*no*		*no*	*yes*	*yes*	*yes*	*8*
7															
8															
9															
10															

FP7/ H2020 Proposals and projects

This table contains FP7/ H2020 proposals/ projects spinning off from Action activities and including in the proposing consortium at least three Action participants from at least three different countries participating in the Action.

NO.	Title	Name and country of main proposer	Number of proposers	Action participants listed among the proposers (Name, country, role[3] in the Action)	Funding agency submitted to	Date submitted	Date results expected	Result	Call identifier	Relevance to H2020 Societal Challenges[4]?	Was the added value of the Action Networking necessary for the proposal / project?
Projects											
1	List FP7/ H2020 projects resulting from the Action in this section of the table	None yet									
2											
Proposals											
	List FP7/ H2020 proposals submitted as a result of the Action in this section of the table	None yet									

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I.C. Networking

Added value of the Networking
OPTIMISE has enable 2 training school,(one a joint TS with EUFAR). This has enable 32 PhD students and ESRs to gain theoretical knowledge
Extent of the networking
OPTIMISE now has 28 member countries and over 90 active scientists, PhD students and ESRs. It has 2 IPC institutes and a NCC institute. There is also 1 European RTD Organisation (ESA) awaiting approval to join as a MC observer and one NNC commercial company has requested to join the Action.

I.D. Impacts

The impacts that have resulted, or might result from the Action are described in the following table.

Description of the impact	Type of impact[5]	Timing of impact[6]
Development of a community supporting the ESA FLEX candidate mission	Successful (FLEX supported by ESA and will be launched in 2022)	From start of Action until September 2015. Now on going as cal/val activities will be supported by OPTIMISE
Development of instrumentation to support cal/val activities	Improve cal/val	From start of ground-based activities
Development of a spectral database and metadata definition for FLEX ground support measurements	Improve usability and access to data	From start of ground-based activities

I.E Dissemination and exploitation of Action results

Describe the Action's dissemination and exploitation approach as well as all activities undertaken to ensure dissemination and exploitation of Action results and the effectiveness of these activities.

Add description here

Item/ activity	Target audience	Result	Hyperlink
Website	Action Members, International Research Community and general public	A website has been established with general information about OPTIMISE, instructions on how to join, information on the members, and dissemination materials (e.g. publications, Newsletter, flash OPTIMISE presentations). The site is being regularly updated. In addition, website visits are being counted visits to monitor dissemination.	http://optimise.dcs.aber.ac.uk/
Logo	General	An OPTIMISE logo was created to increase OPTIMISE visibility. The logo can be found in our Website	http://optimise.dcs.aber.ac.uk/dissemination/supporting-materials/
Flash Presentation	Action Members	A 4 slide power point presentation of OPTIMISE was created and uploaded into the Website. This presentation is targeted to Action Members to disseminate OPTIMISE when having a Conference Presentation	http://optimise.dcs.aber.ac.uk/dissemination/supporting-materials/
Presentations in National and International Conferences	Scientific Community (General and targeted)	OPTIMISE has been presented in the following Meetings/Conferences by Action Members: a) OPTIMISE Presentation in ICOS-Finland Scientific Workshop, Kuopio 26-28.5.2014.	a) http://www.icos-infrastructure.fi/?q=node/20

[5] Scientific/ technological, Economic, Societal
[6] Achieved/ Foreseen within 2 years/ Foreseen 2-5 years/ Foreseen 5-10 years/ Foreseen 10+ years

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		By Albert Porcar-Castell. Title of presentation: Introducing OPTIMISE: Innovative optical Tools for proximal sensing of ecophysiological processes (COST Action ES1309). b) OPTIMISE Flash Presentation. In "2015 HyspIRI Science and Applications Workshop", 13-15 October, CalTech, Pasadena, California. By Sergio Cogliati. Title of presentation: Automated field spectroscopy systems for collecting continuous measurements of radiance/reflectance in support of hyperspectral satellite missions. c) OPTIMISE Flash Presentation. In "Ecology at the Interface", 21-25 September, Rome, Italy. By Mirco Migliavacca. Title of presentation: Using ecosystem level CO2 fluxes, hyperspectral remote sensing and plant traits to evaluate the effects of nutrient availability on the functioning of a Mediterranean grassland. d) OPTIMISE Flash Presentation In Proceedings of SPIE. Vol. 9637 SPIE, 2015. 963705. Toulouse. A. Mac Arthur, and I. Robinson "A critique of field spectroscopy and the challenges and opportunities it presents for remote sensing for agriculture, ecosystems, and hydrology" These presentations ensure that OPTIMISE activities are known to other scientists that can then turn to our Website for further information	b) https://hyspiri.jpl.nasa.gov/events/2015-hyspiri-science-and-applications-workshop c) http://www.ecologyatinterface.eu/files/FInal_Programme%281%29.pdf d) http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=2464179
Scientific Presentations in OPTIMISE Meetings	Action Members	11 Scientific presentations were held during the first plenary meeting (Milano, October 2014), and 12 in the second plenary meeting (Madrid, 30-31st March 2015).These presentations covered OPTIMISE relevant subjects and where held by OPTIMISE Members and invited speakers	See programmes at http://optimise.dcs.aber.ac.uk/workshops-meetings/milano-workshop-and-mc-meeting/ and http://optimise.dcs.aber.ac.uk/workshops-meetings/madrid-workshops-mc-meeting-2015/
Summer Schools	Early stage researchers (ESRs)	A total of 40 participants, including trainers, contributed to the two summer schools organized during the first phase of OPTIMISE. During these schools, knowhow and relevant knowledge was disseminated to ESR, and challenges were discussed between ESRs and trainers.	See Newsletter 1 for more details: http://optimise.dcs.aber.ac.uk/dissemination/newsletter/
Review Paper	Scientific Community	A Review Paper (See above: EUROSPEC: at the interface between remote-sensing and ecosystem CO2 flux measurements in	http://www.biogeosciences.net/12/6103/2015/bg-12-6103-2015.html

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Introducing OPTIMISE		Europe) was published. This paper introduces, amongst others, OPTIMISE to the general Scientific Community	
Newsletter 1: The ABEL and SWAMP Schools	Action Members and relevant International Research Community.	Activities from Summer Schools and Action updates disseminated to Action Members and related stakeholders	http://optimise.dcs.aber.ac.uk/dissemination/newsletter/
Bi-lateral discussions	Targeted Stakeholders	Discussions between OPTIMISE Chair and Head of Campaigns Section for ESA for ESA engagement in OPTIMISE activities	ESA have applied for MC Observer status https://e-services.cost.eu/action/ES1309/mc/observers

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I.F. Action success(es)

COST regularly communicates the successes of Actions. At this point in time what aspect(s) (outcomes and/ or impacts, rather than activities) of this Action is/ are the most suitable for communication?

Description of the success story	Dimension of the success ■ Breakthrough: scientific, technological or socioeconomic ■ Policy implementation (specify which policy) ■ Capacity building
None yet	

II. Management Report

II.A. Overview of expenditure

Insert below in the yellow cells the summary of figures from the Yearly Financial Reports (YFRs) of completed Grant Periods and an IFR of any incomplete Grant Period – the Totals (non-yellow cells) will automatically sum.

	Grant Period 1	Grant Period 2	Grant Period 3	TOTAL
GP start and end dates	(01/06/2014-31/05/2015)	(01/06/2015-22/12/2015)	(dd/mm/yyyy-dd/mm/yyyy)	
Grant Holder institution	Aberystwyth University(United Kingdom)	Aberystwyth University (United Kingdom)	GH institution name (country code)	
Meetings	EUR 55,001.19	EUR 54,100.00	EUR -	EUR 109,101.19
Training Schools	EUR 30,755.02	EUR 47,474.03	EUR -	EUR 78,229.05
STSMs	EUR 5,540.00	EUR 19,880.00	EUR -	EUR 25,420.00
Dissemination	EUR 4,398.00	EUR 1,500.00	EUR -	EUR 5,898.00
OERSA[1]	EUR -	EUR -	EUR -	EUR -
Total Scientific Expenditure	EUR 95,694.21	EUR 122,954.03	EUR -	EUR 218,648.24
FSAC[2]	EUR 12,699.91	EUR 18,443.10	EUR -	EUR 31,143.01
TOTAL	EUR 108,394.12	EUR 141,397.13	EUR -	EUR 249,791.25

[1] OERSA = Other Expenses Related to Scientific Expenditure (e.g. bank charges)
[2] FSAC = Amount received by Grant Holder for Financial Scientific and Administrative Coordination

II.B. Budget and Participation management

II.B.1 Budget spent in relation to individuals/ institutions outside participating COST countries

STSMs from or to institutions from countries other than Participating COST countries

The table below describes the added value STSMs to approved institutions in IPC or NNC or Specific Organisations and any STSMs from an approved institution in an NNC to a participating COST country.

Grantee		Host		Date	Topic and value added to the Action
Institution	Country	Institution	Country		
none to date					

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Invited Speakers

The table below highlights the added value of Invited Speakers from COST countries that have not accepted the MoU and/ or non-participating NNC, IPC or Specific Organisations whose participation at a meeting or Training School was reimbursed by the Action.

Participant name	Institution	Country	Event date	Topic and added value to the Action
None to date				

Dissemination meetings

The table below highlights the added value of Dissemination Meetings financed from Action funds.

Participant name	Role	Country	Date	Location	Topic and added value to the Action
None to date					

II.C. Participants

Management Committee		
Name	Country	Email address
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II.D. Specific issues

This section is confidential to the Management Committee, and the COST Association (Administration, Scientific Committee and Committee of Senior Officials); and is not included in the version of the report that is published on the COST website.

The Action encountered the following particular difficulties in the implementation of the Action (e.g. imbalances of participation across the Working Groups, inactive country representatives).
Describe the issue(s) here or write “no particular difficulties encountered”.
This Action primarily concerns optical remote sensing in the natural environment and as such work needs to take place during time of meteorological conditions and high levels of natural (solar) illumination i.e. summer months (summer). Due to the late allocation of funds, the first summer season was missed, resulting in an 8 month year and one unmanned aerial vehicle (UAV) training school could not be held. In addition, the second year of the Action is effectively 11 months, as the financial reporting date has been brought forward. Progress has therefore not been as advanced as originally planned. This is particularly the case for Working Group 2 which is predicated on field work. An additional constraint was that the authorities in Spain refused permission for OPTIMISE participants to fly the (UAV) used as sensor platforms. There had been a change in national legislation between OPTIMISE planning and the first training school. There have also had to be some changes in the core group and management members: two members (the vice Chair – expected back in post during 2016) and a Training Group coordinater) have taken maternity leave; a WG Leader resigned due to personal family reasons; and the Action Manager resigned and move to employement in another institute. Nevertheless, all positions are now filled and planning for the next Action period is progressing well.

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Annex 1

Definitions:

COST Action Challenge (main aim)	"The research question addressed by the COST Action targeting scientific, technological, and / or socioeconomic problems"
COST Action Innovation	"The creation and / or development of new or improved concepts, products, processes, services, and / or technologies that are made available to markets, governments and society"
COST Action objectives	"COST Action objectives are the results that an Action needs to achieve in order to respond to meet its challenge. These are SMART (Specific, Measurable, Achievable, Relevant, Timely) and twofold: research coordination objectives and capacity building objectives."
COST Action research coordination objectives	"Achieving these objectives turns COST Actions from initially scattered teams into one transnational team and leverages the existing funded research. These objectives entail the distribution of tasks, sharing of knowledge and know-how, and the creation of synergies among Action participants to achieve specific outputs."
COST Action capacity building objectives	"Achieving these objectives entail building critical mass to drive scientific progress, thereby strengthening the European Research Area. They can be achieved by the delivery of specific outputs and / or through network features or types and levels of participation."
COST Action networking activities	"any activities organised by the COST Action (whether or not directly funded by COST) in order to achieve research coordination and capacity building objectives."
COST Action networking tools	"instruments through which eligible activities can be funded"
COST Action outputs	"direct results from the COST Action activities. These can be codified knowledge, tacit knowledge, technology, and societal applications."
COST Action impact	"the short- to long-term scientific, technological, and / or socioeconomic changes produced by a COST Action, directly or indirectly, intended or unintended."
COST Action deliverable	"a distinct, expected and tangible output of the Action, meaningful in terms of the Action's overall objectives such as a report, a document, a technical diagram, a software etc. Action deliverables are used to measure its progress and success."
COST Action milestones	"Control points in the Action that help to chart progress. They are also needed at intermediary points so that, if problems have arisen, corrective measures can be taken. A milestone may be a critical decision point in the Action where, for example, the MC must decide which of several technologies to adopt for further development (e.g. core group and MC meetings, mid-term reviews)"
Inclusiveness Target Country (ITC):	Current COST Member Countries targeted by the COST inclusiveness Policy ("Inclusiveness Target Countries" (ITC)): EU 13 (Bulgaria, Cyprus, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Malta, Poland, Romania, Slovenia, Slovakia), EU candidate countries (the former Yugoslav Republic of Macedonia, Montenegro, Republic of Serbia, Turkey) and potential EU candidate countries (Bosnia and Herzegovina). In addition, to comply with the EC criteria for 'Spreading Excellence and Widening Participation', Portugal and Luxemburg are included.

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