Kick-Off Meeting

HELIOSARES

5 & 6 October 2009

Program

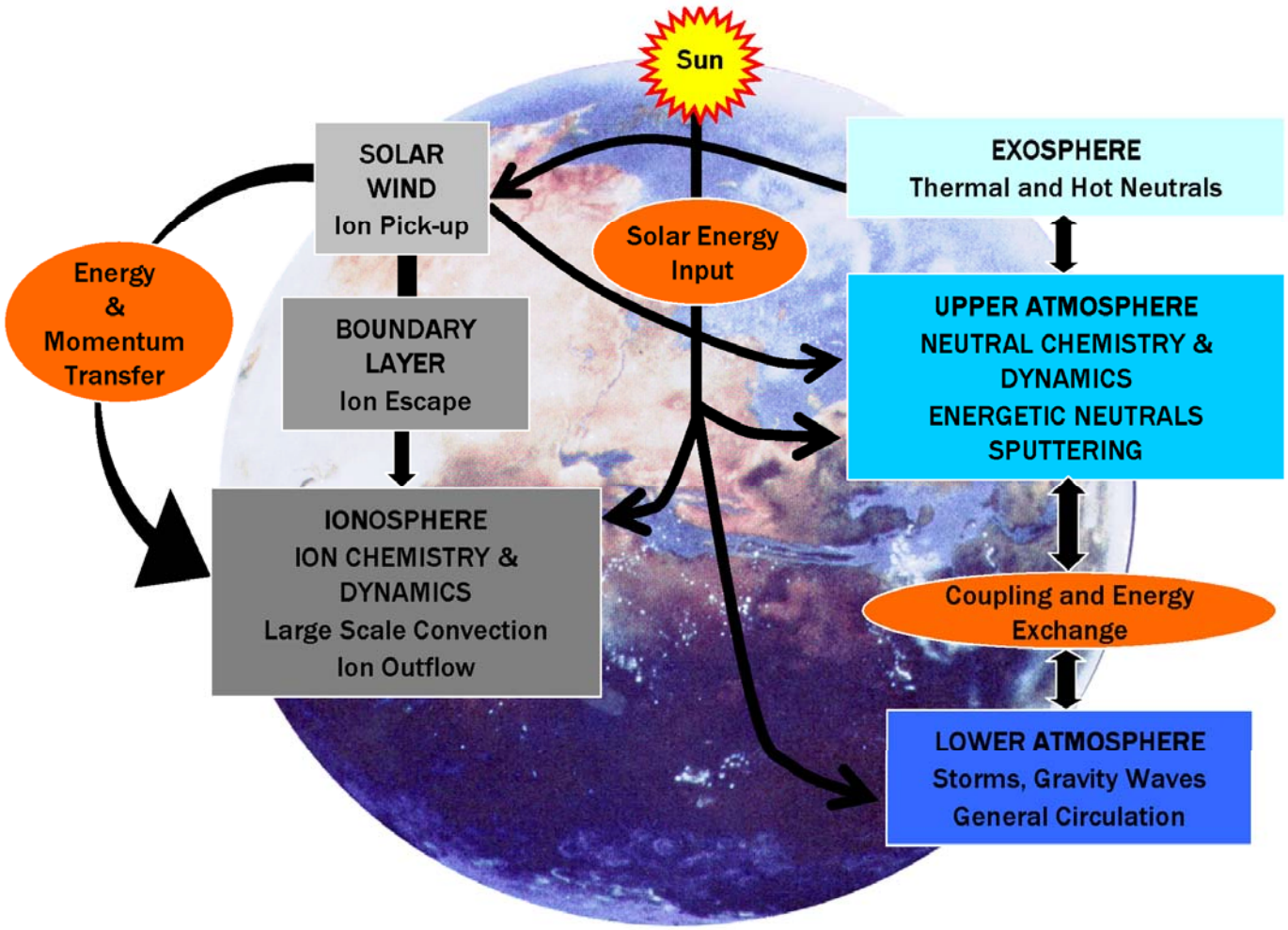
First day

- Introduction	**F. Leblanc**
- MGCM	**F. Gonzalez-Galindo**
- MGCM, objectives	**F. Forget**
- MEX (ASPERA-3/ELS and IMA), MGS	**C. Mazelle**
- Objectives of HELIOSARES	**C. Mazelle**
12h30 – 14h00 Lunch time	
- Magnetospheric modelling	**R. Modolo & G. Chanteur**
- Magnetospheric modelling, objectives	**R. Modolo**
- Exospheric modelling	**J.Y Chaufray**
- Exospheric modelling, objectives	**F. Leblanc**
- MAVEN and present modelling efforts in US	**D. Brain**
- MAVEN and HELIOSARES – discussion	**All**

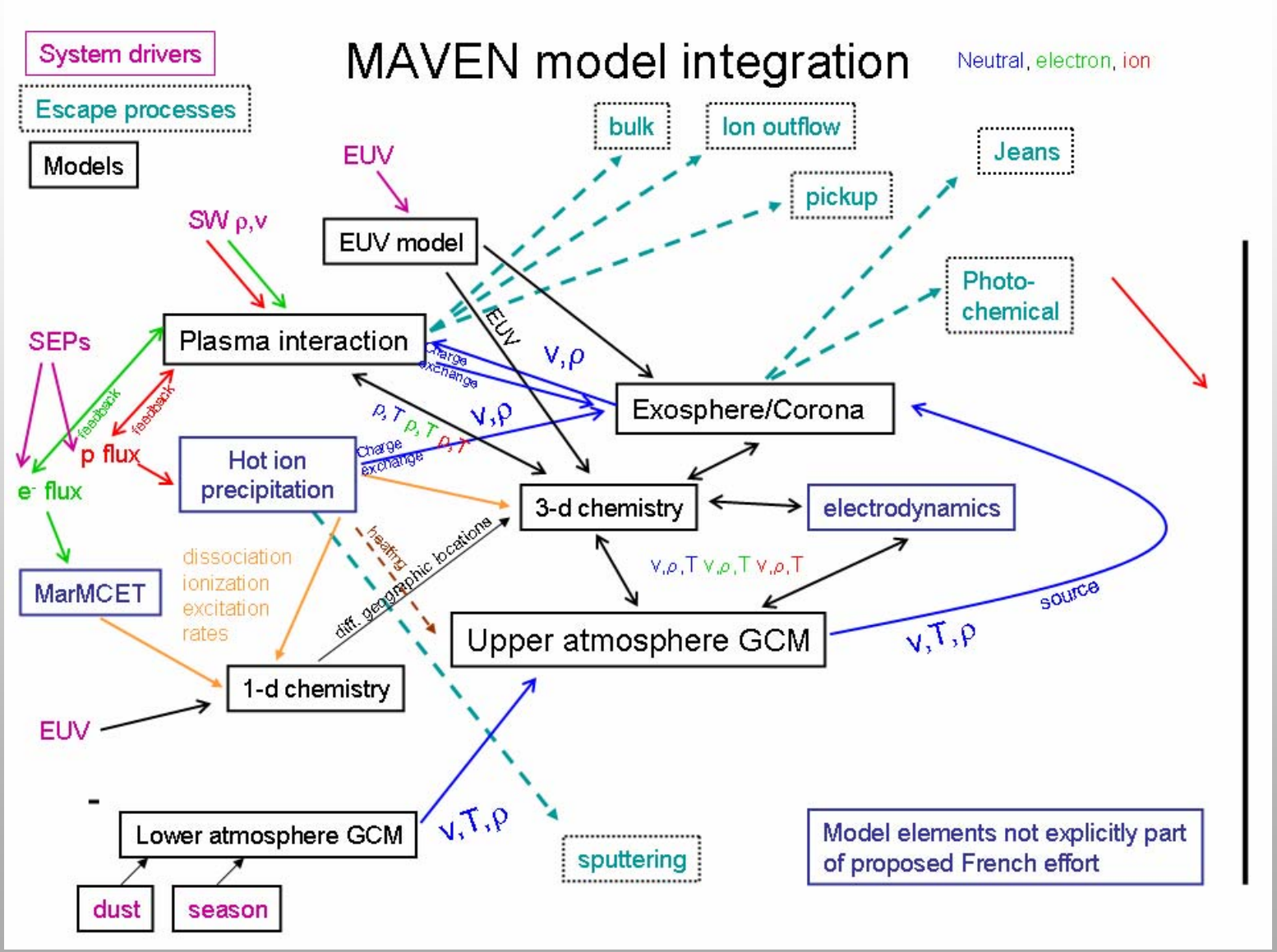
Second day

- Plan to realize each task	**F. Leblanc**
Main steps	
Validation	
- Deliverables	

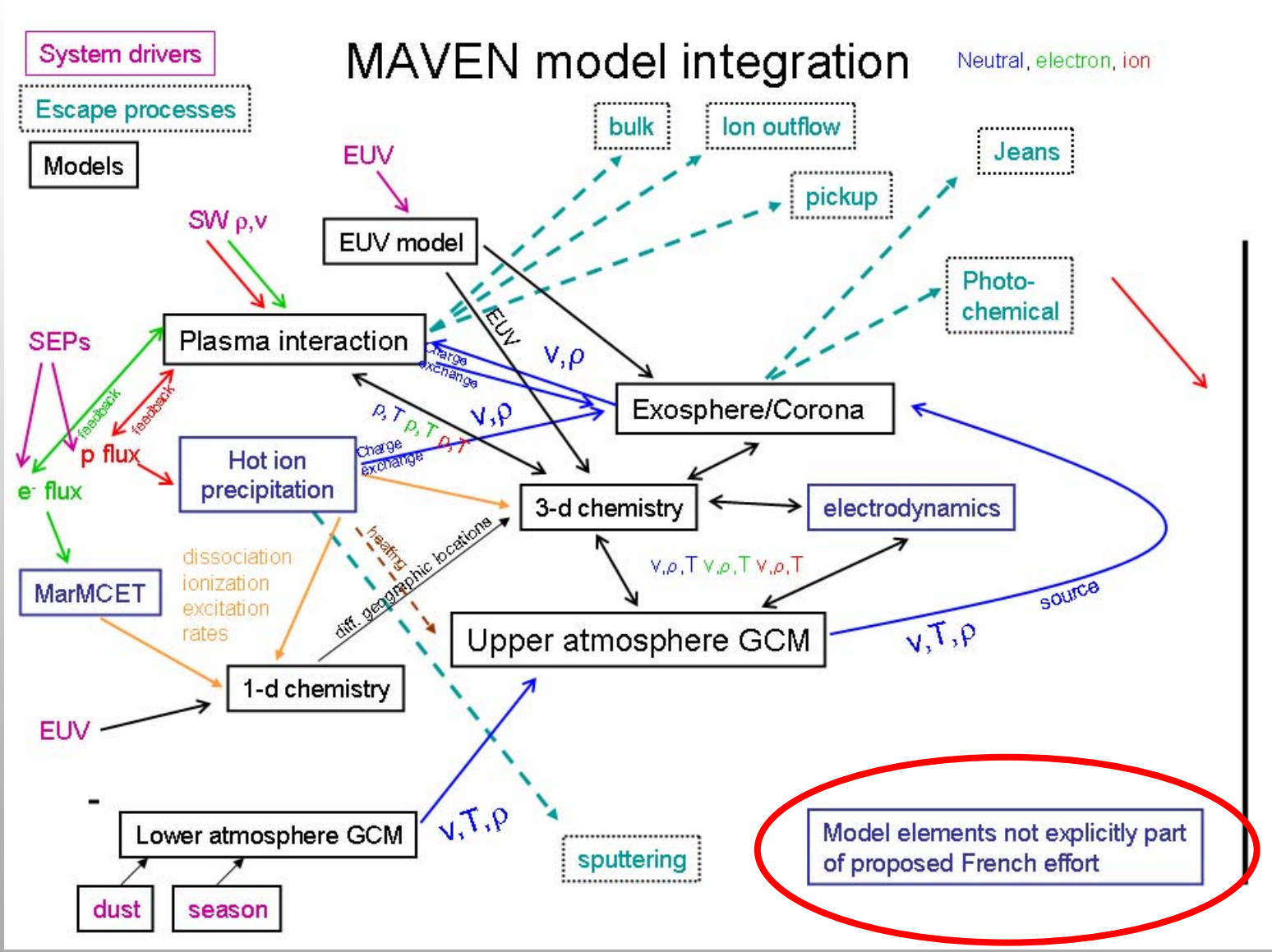
HELIOSARES in one drawing



Or with the one of MAVEN team



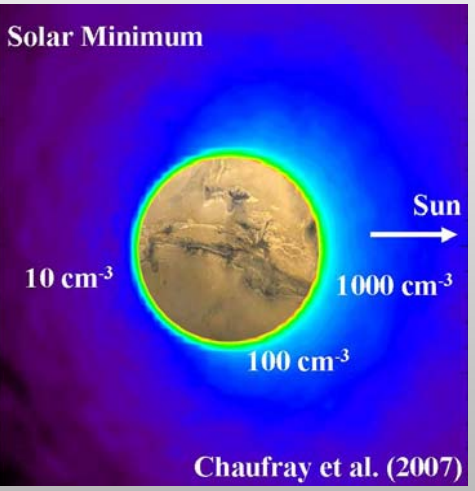
Or with the one of MAVEN team



HELIOSARES GOALS

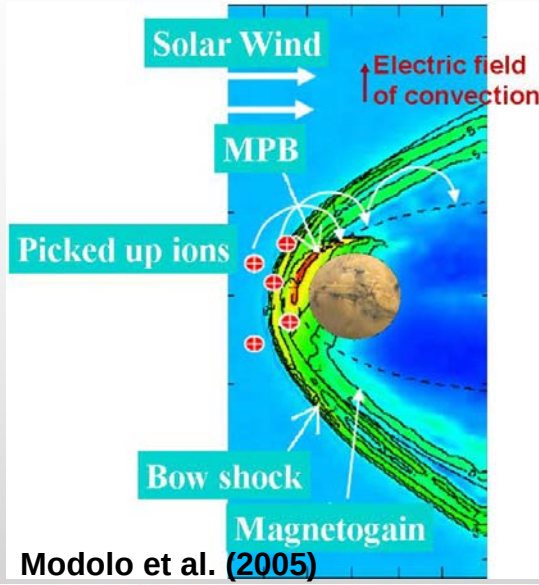
self-consistent relations between the:

- Magnetosphere formed by the interaction of the solar wind with Mars' atmosphere,

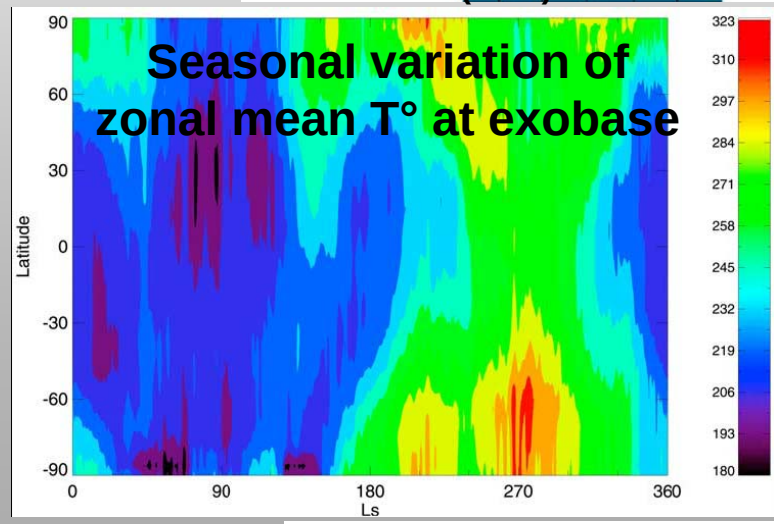


- Exosphere formed from the thermosphere and its interaction with the solar wind,

- thermosphere/ionosphere, source of the exosphere and influenced by the solar wind penetration.



Modolo et al. (2005)



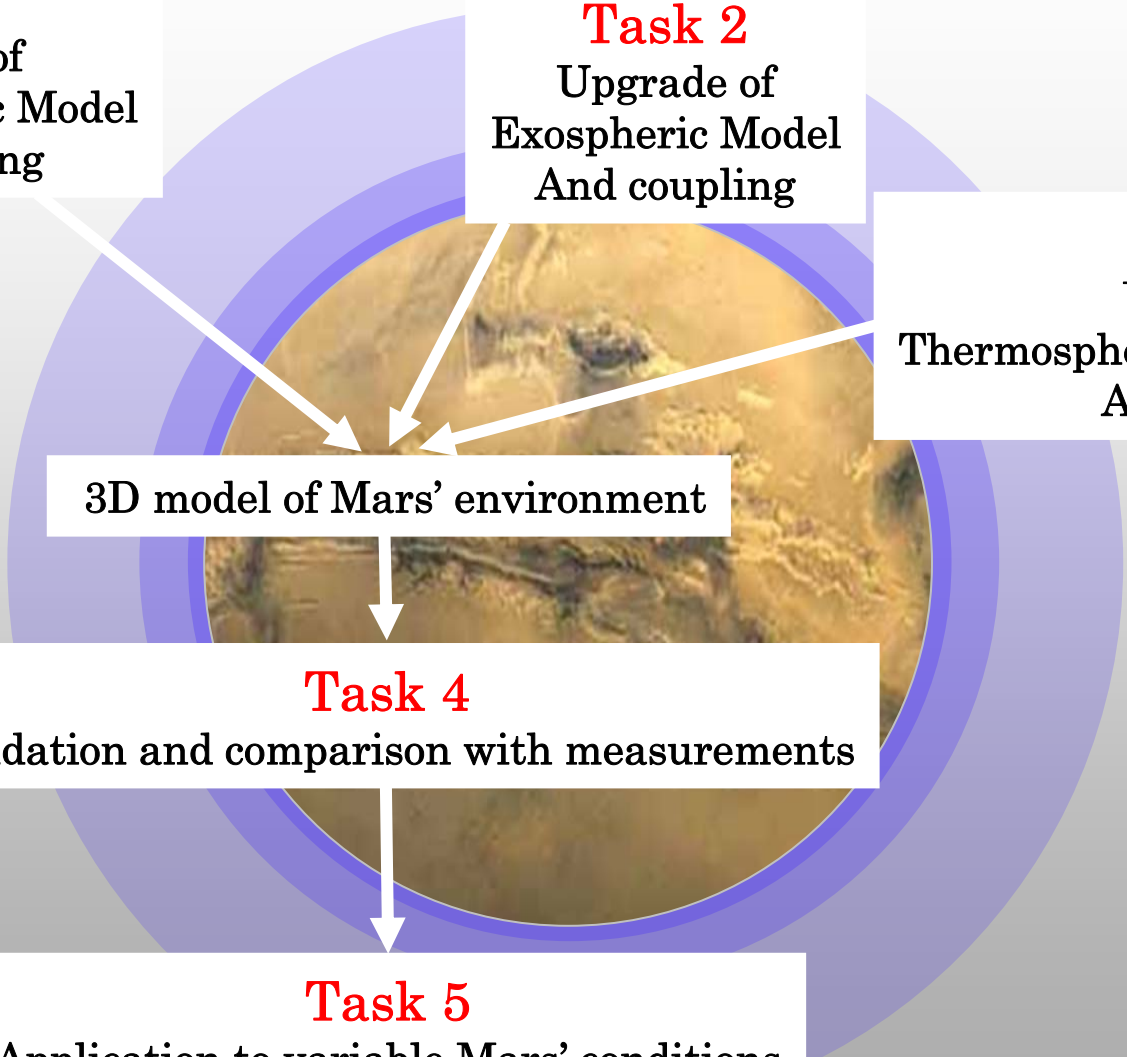
Gonzalez-Galindo et al. (2009)

HELIOSARES TASKS

Task 1
Upgrade of
Magnetospheric Model
And coupling

Task 2
Upgrade of
Exospheric Model
And coupling

Task 3
Upgrade of
Thermospheric/ionospheric Mod
And coupling



3D model of Mars' environment

Task 4
Validation and comparison with measurements

Task 5
Application to variable Mars' conditions
Extrapolation to Mars' history

HELIOSARES ORGANIZATION

Task 1: R. Modolo with one IR/post-doctorant

Reduction of the spatial scale of the hybrid code

Task 2: F. Leblanc with one pot-doctorant

Multi-species exosphere with GCM inputs

Task 3: F. Forget/F. Leblanc

Introduction of ionospheric transport

Coupling with magnetosphere

Task 4: C. Mazelle

MGS/MEX data analysis and comparison with models

Task 5: F. Leblanc and R. Modolo

Studies of test-cases

HELIOSARES SCHEDULE

Start Date: 5th October 2009

Tasks		Year 1						Year 2						Year 3						Year 4					
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
Task 1 Magnetospheric model Responsible : R. Modolo	1.1 Curvilinear grid																								
	1.2 Parallelization																								
	1.3 Lower boundary																								
	1.4 Crustal magnetic field																								
	1.5 User interface and coupling																								
Progress Report of Task 1 and Team meeting																									
Writing of paper(s) on Task 1																									
Task 2 Exospheric model Responsible : Leblanc F.	2.1 Multi-species																								
	2.2 Exosphere and coupling																								
Progress Report Task 2 and Team meeting																									
Writing of paper(s) on Task 2																									
Task 3 Thermospheric model Responsible : Forget F. for Task 3.1 and F. Leblanc and R. Modolo for Tasks 3.2 - 3.3	3.1 Ionospheric developments																								
	3.2 Extension up to the exobase																								
	3.3 Validation and coupling																								
Progress Report Task 3 and Team meeting																									
Writing of paper(s) on Task 3																									
Task 4 Comparison with measurements Responsible: Mazelle C.	4.1 Definition of diagnostic tools																								
	4.2 Comparison model - data																								
Progress Report Task 4 and Team meeting																									
Writing of paper(s) on Task 4																									
Task 5 Application to Mars Responsible : Leblanc F & Modolo R.	5.1 Seasonal Variations																								
	5.2 Extreme solar conditions																								
Writing of paper(s) on Task 5																									

Post-doctorant – IR positions

HELIOSARES DELIVERABLES

Tasks	Deliverables	Delivery date
Task 1 Magnetospheric model	Magnetospheric code with its interface	5 April 2011
	Progress Report and Team meeting	5 October 2011
Task 2 Exospheric model	Multi-species exospheric model with thermal and non-thermal components	5 October 2011
	Progress Report and Team meeting	5 October 2011
Task 3 Ionospheric/Thermospheric models	Ionospheric module integrated to EMGCM	5 April 2011
	Progress Report and Team meeting	5 October 2011
Task 4	Comparison model – data	5 October 2012
	Progress Report and Team meeting	5 October 2012
Task 5 Application to Mars environement	Simulation of Martian environment for solar minimum and maximum	5 October 2012
	Simulation of Martian environment for variable solar conditions	5 April 2012
End of the proposal	Final Report and Team meeting	5 October 2013

+ Meetings within each Task

+ Publications, conference presentations, PhD and Stage

HELIOSARES PARTICIPANTS

Name	Laboratory	Role
Leblanc F.	LATMOS	Coordinator and Responsible of Tasks 2, 3.2, 3.3 and 5
Modolo R.	LATMOS	Responsible of Tasks 1, 3.2, 3.3 and 5
Forget F.	LMD	Responsible of Task 3.1
Gonzalez-Galindo F.	LMD	Will participate to Task 3.1
Mazelle C.	CESR	Responsible of Task 4
Sauvaud J.-A.	CESR	Will participate to Task 4
Fedorov A.	CESR	Will participate to Task 4
Blelly P.-L.	CESR	Will participate to Task 3
Chaufray J.Y.	SWRI/USA	Will participate to Tasks 2 and 5
Chanteur G.	LPP/France	Will participate to Tasks 1 and 5
López-Valverde M.A.	IAA/Spain	Will participate to Task 3.1
Lilensten J.	LPG/France	Will participate to Task 3
Witasse O.	ESA/ESTEC	Will participate to Task 3

HELIOSARES COLLABORATORS

- **D. Brain, Space Science Laboratory (USA), MAVEN Team, preparation of MAVEN science**
- **E. Dubinin, MPS (Germany), specialist of Mars environment and of Phobos 2 and MEX data analysis**
- **B. Langlais, Laboratoire de Planétologie et Géodynamique de Nante (France), specialist of Mars internal structure and magnetic field**
- **E. Richter, Laboratoire de Physique des Plasmas (France), PhD Student on Mercury's magnetosphere modelling applied to Mercury**
- **R. Lillis, Space Science Laboratory (USA), MAVEN Team, preparation of MAVEN science**
- **S. Lebonnois, Laboratoire de Météorologie Dynamique (France), Responsible of a research project to develop VGCM**
- **R.E. Johnson, University of Virginia (USA)**

And others if interested...

HELIOSARES open positions

One IR/Post-doc working on Task 1: parallelization of the hybrid code and application (18 months in LATMOS)

No candidate

One Post-doc working on Task 2: development of the multi-species 3D exospheric model (18 months in LATMOS)

No candidate

One Post-doc working on Task 3: development of the ion transport in the LMD MGCM (24 months in LMD/LATMOS)

J.Y Chaufray

One Post-doc working on Task 4: comparison with measurement (18 months in CESR)

No candidate