N2 DWG 2
Outcome N2 meeting#1

- Investigation of solar-planetary interactions
- What is the influence of the solar wind interaction at Jupiter?
- What is the origin of the planetary modulated (quasi-periodic) signatures at Saturn?
- Can we detect an exoplanet magnetosphere now?

N2 DWG2: Outcome N2 meeting#1

Aims: What is the origin of the planetary modulated (quasi-periodic) signatures at Saturn?	
Modelling: *Wave theory: investigate the global response of the magnetosphere to external/internal perturbations.* *Solar wind-magnetosphere-ionosphere coupling (Leicester, Warsaw)* *New global magnetic and plasma models (IC, Braunschweig, MSSL, U. Michigan, JHU/APL)* Observations: *magnetic field, particle data, radio emissions, energetic neutral atoms, UV observations from Cassini/Hubble Space Telescope, InfraRed Telescope Facility, Chandra X-ray Observatory, X-ray Multi-Mirror* Expertise: *DWG2 + Cassini Teams and PIs, Jean-Claude Gerard, Denis Grodent, Randy Gladstone, Graziella Branduardi-Raymont +other theoreticians/frequency analysis experts*	Initiate collaborations with new scientists Correlate multi-instrument and multi-observatory data sets Use of models/expertise to characterise quasi-periodic signatures
Aims: Can we detect an exoplanet magnetosphere now?	
Modelling: *-comparisons with Jupiter and other magnetospheres* *- consider sub-sonic versus super-sonic interactions* *- consider sub-Alfvenic versus super-Alfvenic interactions* Observations: *Future radio emissions could indicate the presence of a magnetosphere (LOFAR from 2008-2010)* Expertise: *Uwe Motschmann, Helmut Rucker, Pekka Janhunen (FMI) Gombosi/Hansen*	Initiate collaborations with new scientists Extend available planetary models to exoplanetary conditions

N2 DWG2: Outcome N2 meeting#1

Specific Suggestions	Milestones
Aim: Investigation of solar-planetary interactions	
Modelling: *New solar wind propagation modelling – to investigate different solar wind conditions at different orbital distances* Observations: *2003/2004 interval: Cassini (~9AU), Ulysses (~5AU), Mars Express (~1.5AU),ACE (~1AU),solar monitor (SOHO ?)* *Other intervals : Mariner10, Messenger,Venus Express, New Horizons ?* Expertise: *DWG2 + Gombosi/Hansen, R. Prange, J. Luhmann, D. McComas, J. Slavin +others*	Initiate collaborations with solar system scientists Establish a solar wind propagation model Construct a database of multi-spacecraft observations
Aim: What is the influence of the solar wind interaction at Jupiter?	
Modelling: *Solar wind-magnetosphere-ionosphere coupling (Leicester, Warsaw) e.g. reconnection rates, cusp processes* *New global magnetic and plasma models* Observations: *Millennium Campaign at Jupiter (Cassini, Galileo, Hubble Space telescope (UV), Chandra X-ray Observatory, X-ray Multi-Mirror, InfraRed Telescope Facility)* Expertise: *DWG2 + Gombosi/Hansen, Graziella Branduardi-Raymont*	Initiate collaborations with new scientists Further development of existing models Create a database for the Millennium Campaign Recommendations for future ESA jovian mission: *- multi-spacecraft observations* *- solar wind monitoring* *- dedicated moon orbiters*

N2 DWG 2
Science Case 1

1 - Objective or science goal:

Solar wind interaction at Jupiter and Saturn including aurorae?

2 - Needed data sets:

Millennium Campaign at Jupiter (Cassini, Galileo, Hubble Space telescope (UV), Chandra X-ray Observatory, X-ray Multi-Mirror, InfraRed Telescope Facility), other ground-based observations

Saturn Hubble campaign 2004

3 - Problem description

Modelling of the *Solar wind-magnetosphere-ionosphere coupling e.g. reconnection rates, cusp processes and compare it with existing data sets.*

Variations of particle fluxes, pitch angle distributions, energy spectra, aurora brightness,... as indicators of solar wind influence.

4 - Current solution: the way scientist presently work to select data of interest, to access these data and to process it.

PDS, MAPS KP, direct contact between scientists

5 - What services users expect from an IDIS to work more efficiently

add new data sets (relevant events on the Sun, additional data sets from missions in Earth orbit and in the heliosphere for a given time period), add new global transport and plasma models, add relevant Laboratory measurements

6 - Other comments

7 - Key references on science and methodology for this science case

Cowley and Bunce, Clarke et al., Crary et al, Hansen et al., Tomas et al.,...

experience from Earth magnetosphere,...

N2 DWG 2
Science Case 2

1 - Objective or science goal:

What is the origin of the planetary modulated (quasi-periodic) signatures at Saturn?

2 - Needed data sets:

magnetic field, particle data, radio emissions, energetic neutral atoms, UV observations from Cassini/Hubble Space Telescope, InfraRed Telescope Facility, Chandra X-ray Observatory, X-ray Multi-Mirror + Voyager and Pioneer data sets

3 - Problem description

Investigate the global response of the Saturnian magnetosphere to external/internal perturbations.

4 - Current solution: the way scientist presently work to select data of interest, to access these data and to process it.

PDS, MAPS KP, direct contact between scientists

5 - What services users expect from an IDIS to work more efficiently

add magnetic field models of Saturn, time-series analysis tools

6 - Other comments

7 - Key references on science and methodology for this science case

Mitchell et al., Kurth et al., Krupp et al., Gambieri et al., Espinosa et al., Arridge et al.,...

N2 DWG 2
Science Case 3

1 - Objective or science goal:

Investigation of the interaction of magnetospheric plasma with icy moons in the Saturnian system and other giant planets systems

2 - Needed data sets:

particle and fields data sets of Cassini, Voyager and Pioneer data sets

3 - Problem description

Investigate moon-magnetosphere interaction processes and their mutual effects (on the magnetosphere in terms of sources and sinks, on the moon surface via weathering and induced chemistry),

investigate the transport mechanisms in Saturn's magnetosphere by using absorption signatures (determine diffusion coefficients)

4 - Current solution: the way scientist presently work to select data of interest, to access these data and to process it.

PDS, MAPS KP, direct contact between scientists

5 - What services users expect from an IDIS to work more efficiently

add laboratory and model data, provide additional parameters necessary (sputter yields,...)

6 - Other comments

7 - Key references on science and methodology for this science case

Paranicas et al., Roussos et al., Ip et al., Johnson et al., ...

work needed to select science cases

Inventory:

- Identify those key science questions (from all discipline working groups ?) with available data sets (laboratory measurements, ground-based data, space based data, modeling/simulation, existing databases,...)
- how can the different data sets be brought together (space based → laboratory)
- identify experts
- IDIS should concentrate on one “show case” with possible multi-disciplinary inputs

- **N2 coordinator contacts:**

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- **N2 Website:**
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