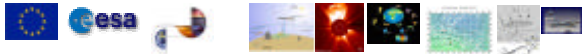


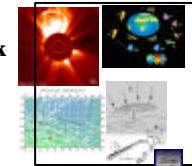
## SPACE WEATHER PROPOSAL for the EU-FP6 GMES-Call

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## Contents

- EU & ESA -GMES Program
- Space Weather & GMES Risk Management
- SW-RISK-Proposal "Space Weather - Risk Indices from Scientific Know-How"



## ESA and EU program Global Monitoring for Environment and Security (GMES)



### Objective

" to establish European capacity for the provision and use of *operational* information for global monitoring of environment and *security*"

### EU-FP6

- GMES is a subarea in the Aeronautics and Space Priority of the 6th Framework Programme
- *the only place where Space Weather is explicitly mentioned in FP6*



## GMES Priority Themes...

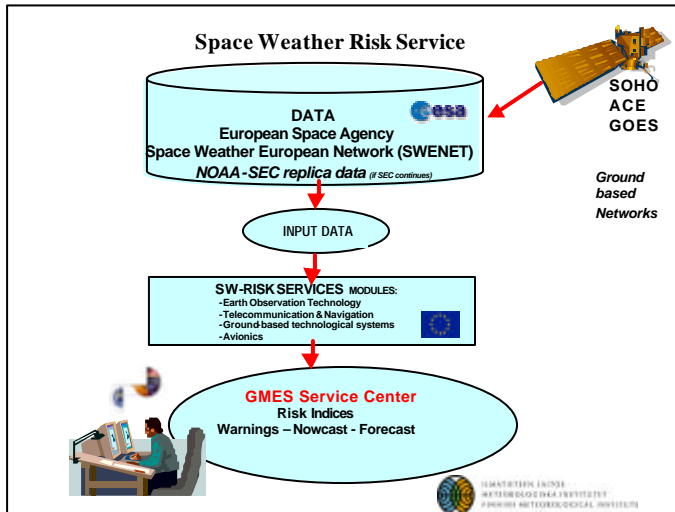
.....

- **SYSTEMS FOR RISK MANAGEMENT** ....To deliver operational support to risk management (early warning, impact assessment and reaction) in European sensitive areas for: **floods, forest fires, oil spills, stability of man made structures.**
- .....

### Space Weather Risk Categories

- (1) **Generic Risks** to the society through disturbing satellite operations and telecommunication used for e.g. monitoring and warning of forest fires, floods, other natural and man-made disasters or other security-related issues
- (2) **Direct Risks** to the functionality and reliability of man-made technological systems.





### SW- Risk Management

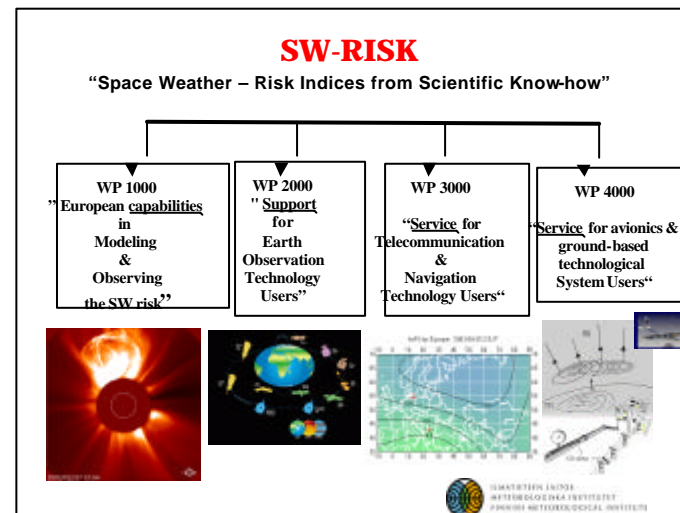
**GMES Risk Services**  
=  
**GMES Risk Indices**

- quantify the disturbance level
- can be forecast or is used as input when forecasting other indices
- meet certain standardised criteria in availability and reliability

### Space Weather Proposal EU FP6 – GMES Call

SW-RISK “Space Weather – Risk Indices from Scientific Know-how”  
STREP-Proposal

- The proposal will follow the above described GMES philosophy
- To be submitted to FP6 – Aeronautics & Space Priority GMES in March 2004
- Estimated budget 2,5 Meuros
- Duration 24 months, June 2005- Dec 2006
- Consortium:**
  - FMI, Finland (Co-ordinator)
  - LPCE, France
  - RAL, UK
  - DLR, Germany
  - end-users, other partners TBD



**WP 1000**  
**"European capabilities in modelling and observing the space weather risk"**


- **GMES Space Weather Service support**
  - evaluation of the input data for risk services
  - End-Users: SW-RISK-project (WP 2000-4000)
- **Future service development beyond the state-of-art**
  - improved modeling (MHD simulations, particle codes) -> improvement in the time span (from hours to days) of the predictions
  - European SW monitor specification
  - End-Users: Future GMES SW-RISK service users, scientific community, satellite industry

**Providing infrastructure for GMES SW services / implementation to GMES Risk Center TBD**





**WP 2000**  
**"Support for Earth Observation Technology Users"**

- **Risks**
  - erosion, single event effect
- **State-of-art**
  - ESA-SDA GEISHA
    - prototype for satellite anomaly analysis
- **SW-RISK Objective**
  - Tailored risk indices for the geostationary satellites having key role in Earth Observation system
- **End-user**
  - Meteorological based services (e.g. forest fires) via GMES
  - others e.g. EUMETSAT ?

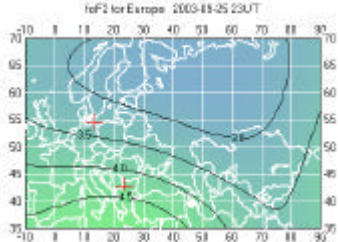


*(Figure by ILWS)*




**WP 3000**  
**"Services for Telecommunication and Navigation Technology Users"**

- **Risks**
  - fadeouts, loss of lock, signal-to noise problems
- **State-of-art**
  - ESA SWIPPA-SDA
    - TEC-maps, TEC-gradients, TEC-forecasts
    - GPS differential phase fluctuations
- **SW-RISK Objective**
  - Alert services for GMES Center
  - Risk indices for radio based communication and navigation systems
- **End-users**
  - GMES, Galileo, GPS etc.



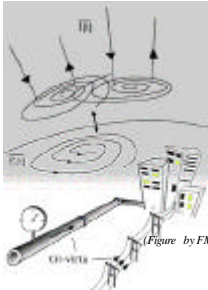
*(Figure by ISES/RWC Warsaw)*



**WP 4000**  
**"Service for avionics & ground-based technological systems users"**

**WP 4000 a GIC**



- **Risk**
  - harmful currents in power transmission lines
- **State-of-art**
  - Several ESA GICSDAs
    - Modelling & monitoring & forecasting tailored GIC-indices for specific customers / networks
- **SW-RISK objective**
  - Geomagnetic induction index → general index for geomagnetic induction effects
- **End-User**
  - GMES Risk Center: "stability of man made structures"

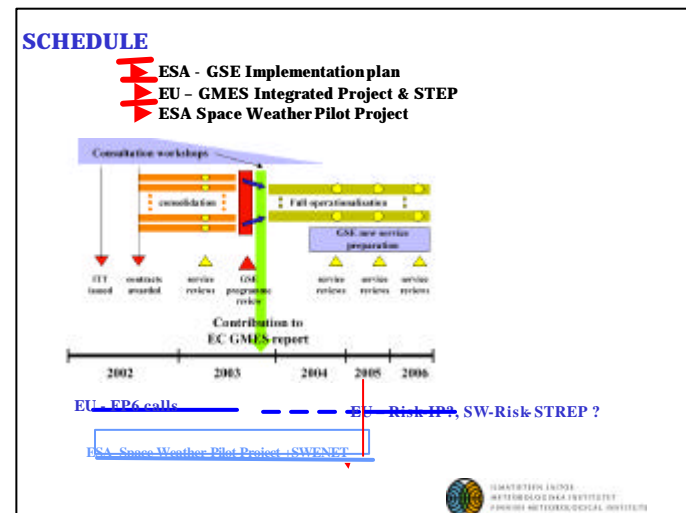
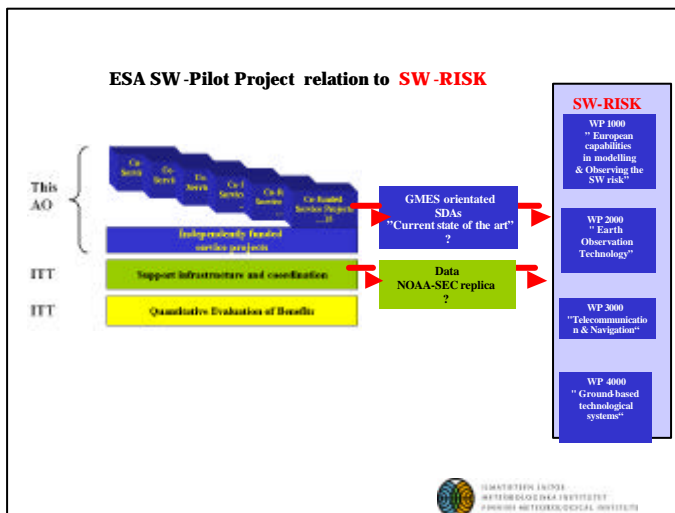
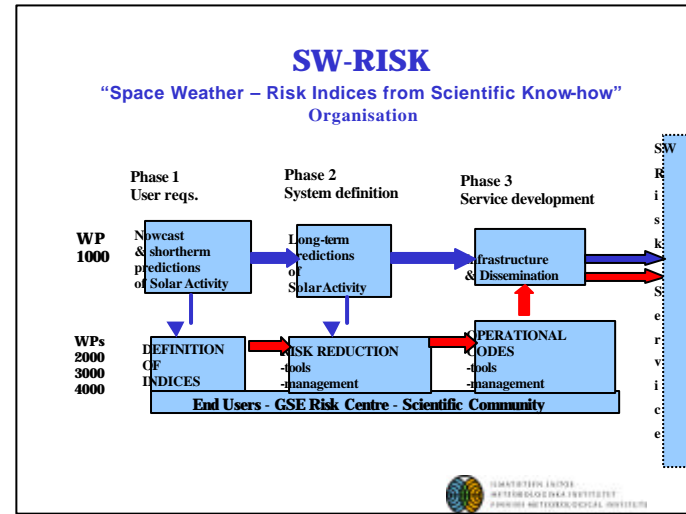
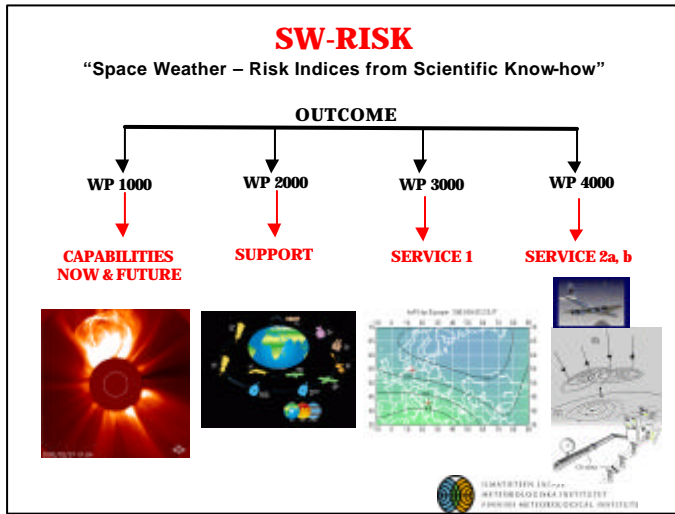


*(Figure by FMI)*

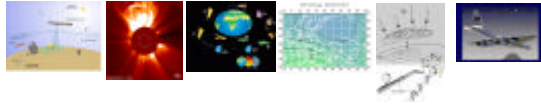
**WP 4000 b AVIONICS**

- TBD



## Motivation for the SW-RISK



- **Traditional risks**
  - Standardised risk indices, nowcasts and forecasts for
    - Enhanced radiation
    - GIC
- **Breakdown of the Information society**
  - Risk indices, nowcasts and forecasts for
    - fadeouts in the communication and navigation
- **European leadership in Know-How of SW effects control**
  - Improved know-how in European satellite operation and design (e.g. Galileo, Earth Observation missions)

