

# DORADE

*D*avos *O*bservatory *R*adiometer *E*xperiment

an instrument *proposed* (!) for the  
**Solar Dynamics Observatory**

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*ILWS meeting Nice*  
April 14./15., 2003

# Overview

- Swiss ILWS interests
- Motivation: Why measuring the solar irradiance?
- Planned TSI experiments
- DORADE design
- Status SDO/DORADE

# Swiss space program organization

- Switzerland has *no national space program* ( $\Rightarrow$  ESA)
- The Swiss space policy is coordinated by the Swiss Space Office (SSO) (Department of Home Affairs)
- I was asked by the SSO to represent the Swiss interests for ILWS

# Swiss involvement in ILWS related observations

present :

- TSI & spectral:  
**VIRGO** on SoHO (since 1996)

future:

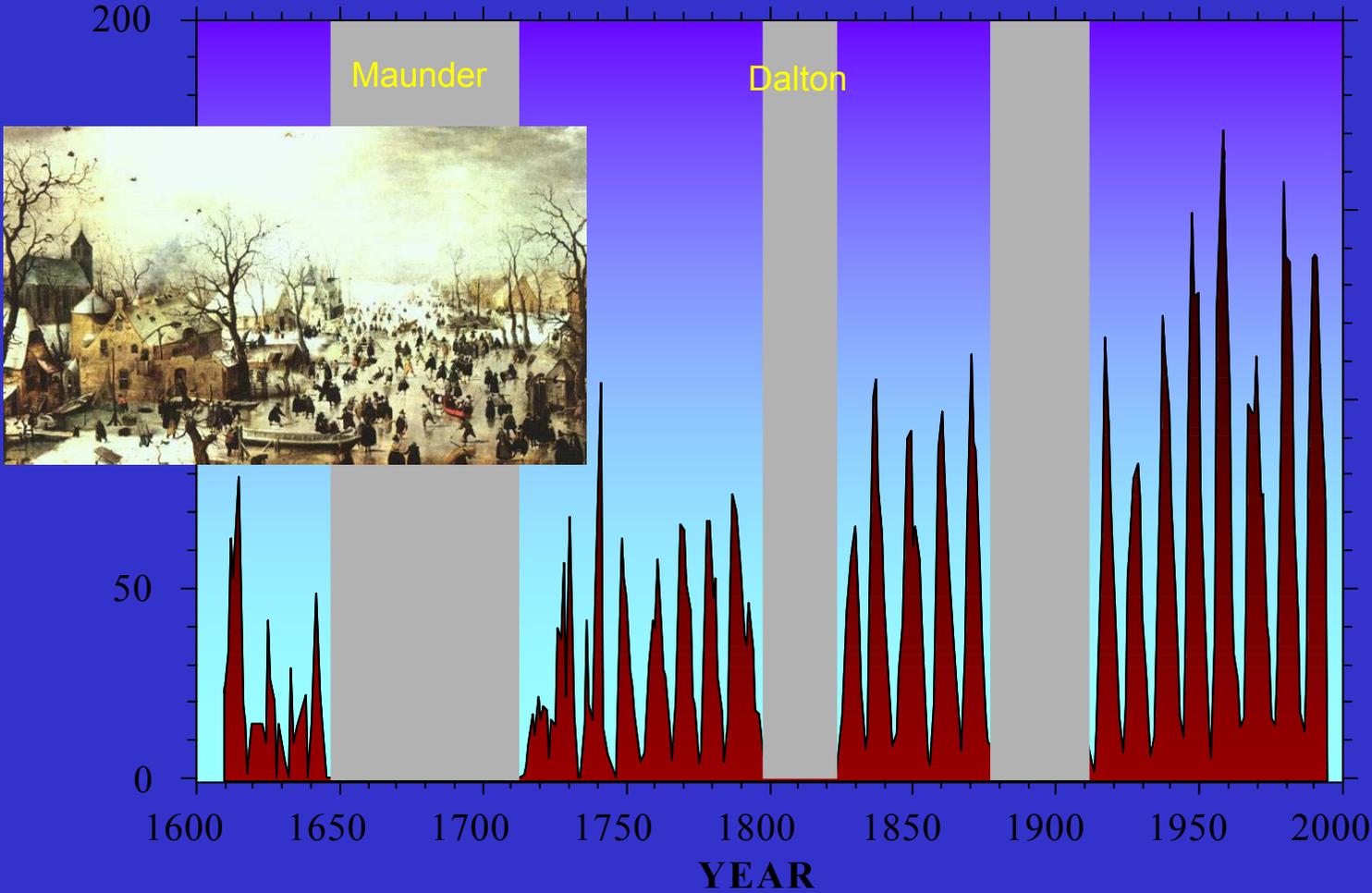
- UV irradiance:  
**PREMOS** = PMOD/WRC contribution to PICARD (F: 2007?)  
**LYRA** = B/CH contribution to PROBA2 (ESA 2005?)
- TSI & spectral:  
**SOVIM** (CH/B experiment on ISS 2004??)

# climate anomalies – ice skating on the Thames 1895



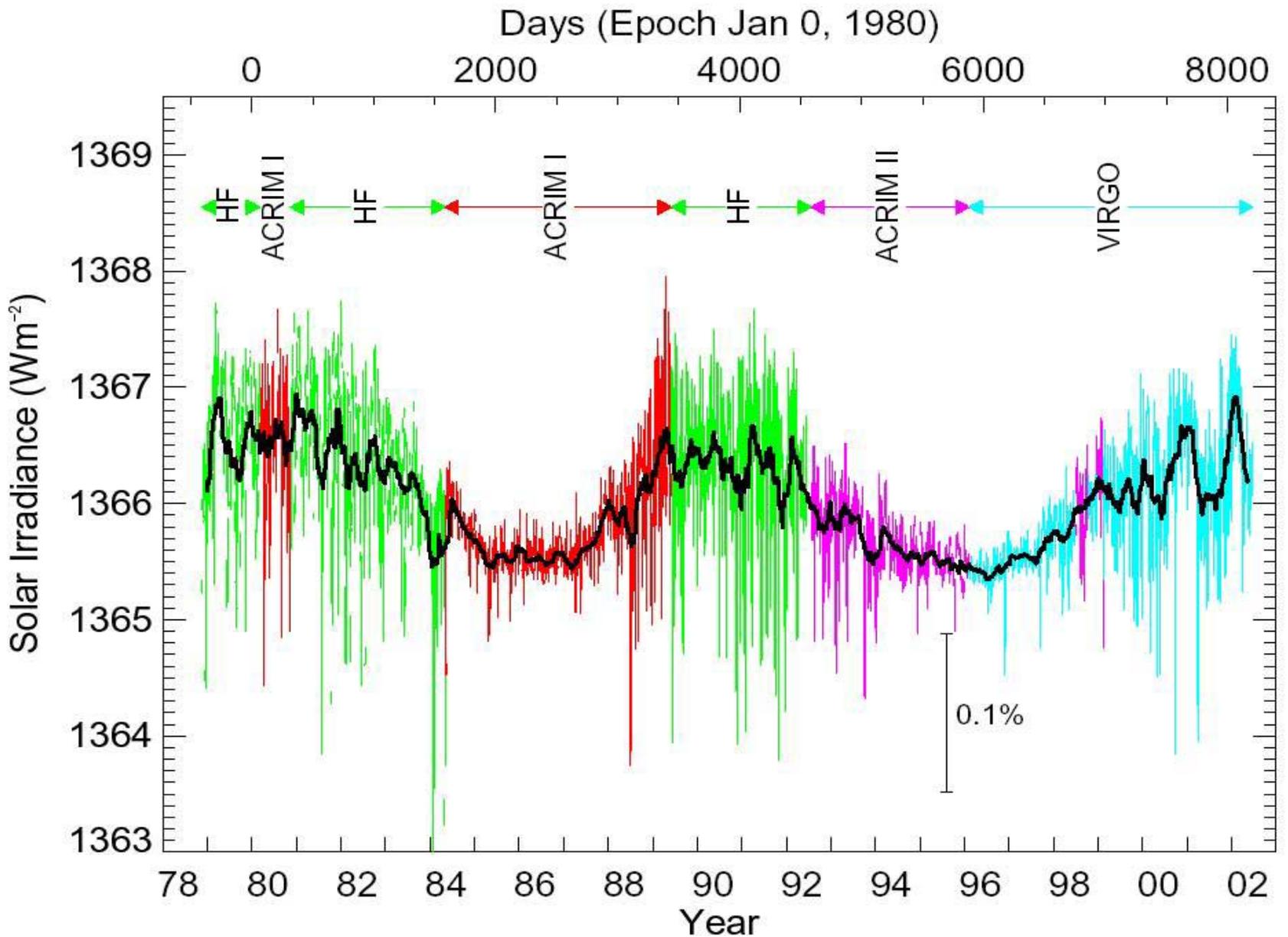
illustration: Dr. J. Beer EAWAG, Switzerland

# climate anomalies



PMOD / WRC

# Is there a long term trend of the minimum TSI?



# TSI observations between 2006 and 2012

ACRIM III (2000-(?)); VIRGO/SOHO 1996-2007(?)

SORCE 2003-2007 (?)

SOVIM 2004-2006 (?); PICARD 2007-2009 (??)

**SDO/DORADE 2007-2012 (TSI ??)**

National Polar Orbiting Operational Environmental Satellite System (NPOESS) are planned to begin not earlier than 2009, but probably as late as 2012

# DORADE science aim

- **Continue** monitoring of the TSI, **closing** the gap between the end of presently operational experiments in 2007 and the planned TSI measurements by the National Polar Orbiting Operational Environmental Satellite System (NPOESS) 2010+
- Investigation of the physical mechanisms of TSI variations by combining DORADE and Helioseismic and Magnetic Imager (HMI) observations

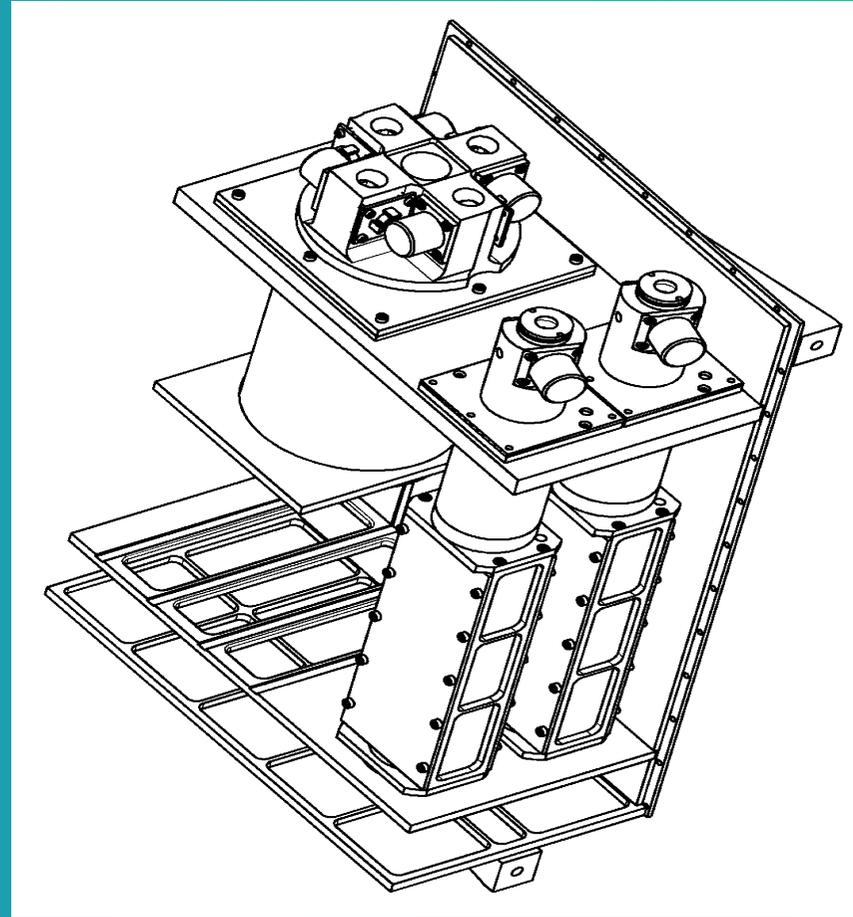
# Davos Observatory Radiometer Experiment DORADE

The DORADE package consists of:

- a pair of space-proven PMO6-V type radiometers
- a new-generation PMO-PS radiometer

The two independent radiometers together form a high stability experiment, which is essential to measure the long-term trend of the total solar irradiance with high precision.

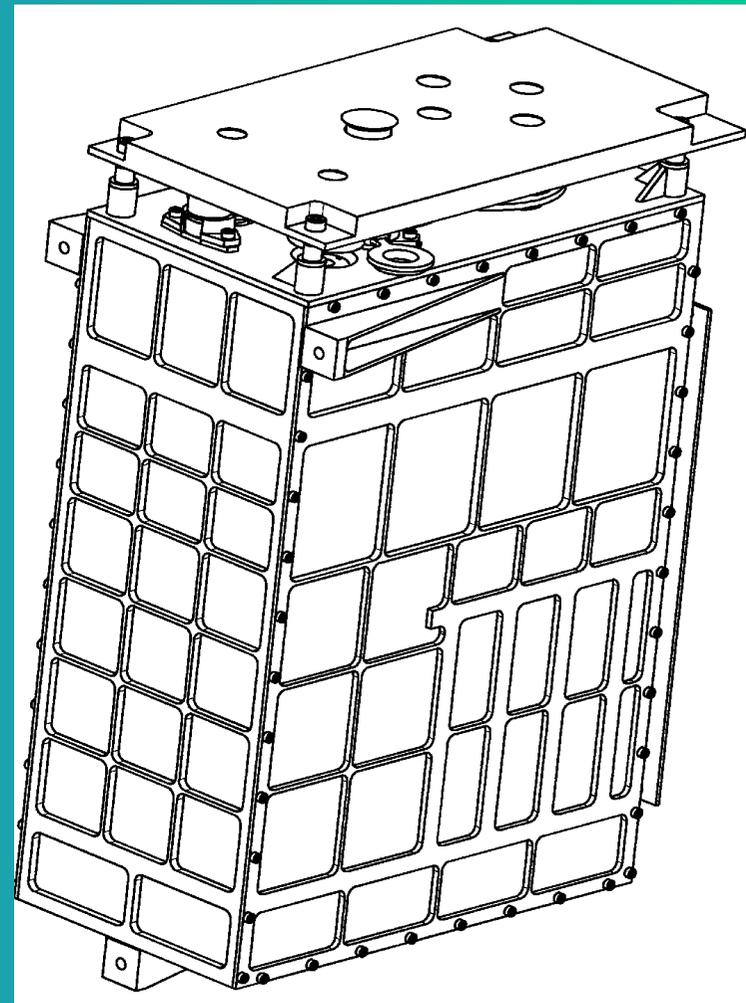
***The combined measurements of the two radiometers will yield a high-stability, high-precision time series of the total solar irradiance.***



# DORADE design

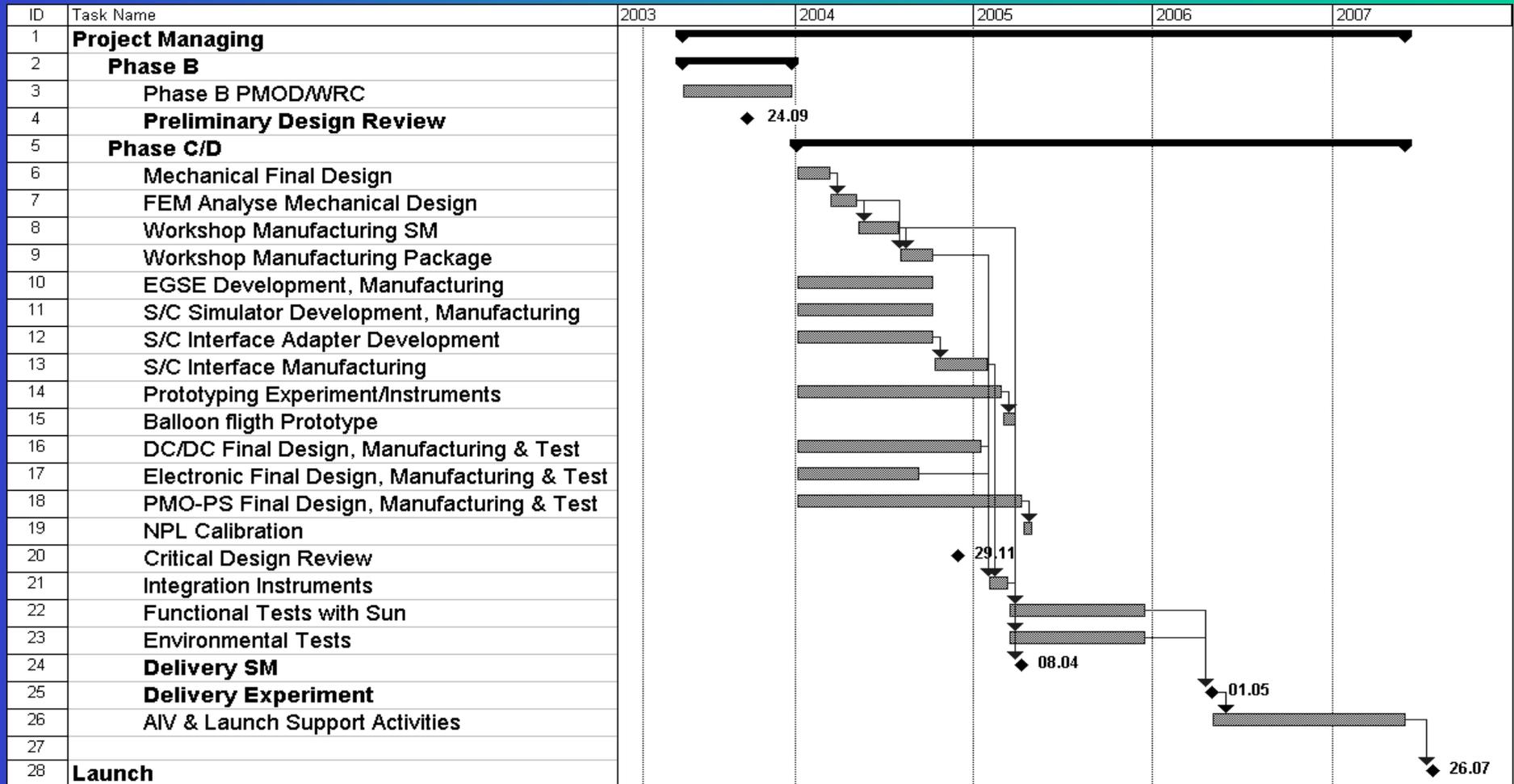
Envelope Dimensions (L x W x H)	256 mm x 172 mm x 403.5 mm
Footprint Dimensions (W x H)	172 mm x 403.5 mm
Mass	< 9.1 kg
Electrical Power – nominal	12 W
Electrical Power – peak (includes continuous nominal operation plus power needs listed in Table 2)	25 W
Electrical Power for thermal control	3 W
Power during eclipses (nominal power plus thermal control power)	15 W
Non-operational heaters	max. 12 W
Nominal data rate	1.8 kbit/s

**Table 1.** Summary of DORADE resources



# DORADE schedule

PMOD / WRC



# SDO/DORADE status

NASA welcomes a TSI instrument provided by ESA  
(answer to HMI-DORADE-proposal by SDO/HMI-PI) ...

... but asks for 4.6 M\$ for integration and launch costs

SDO mission is part of the **ILWS initiative** to which ESA  
would like to contribute

ESA-NASA negotiations ongoing ...

Swiss PRODEX funding of DORADE promised if ESA  
contributes to SDO ⇒ SPC meeting May 2003