



MEGHA-TROPIQUES



A CO-OPERATION PROGRAMME BETWEEN

Centre National d'Etudes Spatial, France

Indian Space Research Organisation, India

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DEFINITION AND OBJECTIVES

- Megha-Tropiques, a joint satellite based mission devoted to
 - the study of atmospheric water cycle and associated convective systems in the inter-tropical zone
 - a better understanding of the tropical climatology
 - the eventual improvement of monsoon forecasting models
- Launch date target: mid of 2006 from Sri Harikota (SHAR)

**from the Sanscrit word for « clouds »*

HISTORICAL STEPS

- 1998: joint decision by CNES & ISRO leading to a one year duration pre-feasibility study
- Statement of Intent signed end of 1999:
 - co-operation agreement with no exchange of funds
 - definition of the sharing of the agencies contributions
- 2000-2001: detailed feasibility studies leading to the freezing of the satellite baseline configuration
- MOU for definition studies signed in May 2001

THREE INSTRUMENT PAYLOAD DEFINITION

- MADRAS (Microwave Analysis & Detection of Rains & Atmospheric Structure):
 - multifrequency passive scanning radiometer (18.7-157 GHz)
 - imaging water vapour, rains and ice distribution
- SCARAB (SCanner for RAdiative Budget):
 - measure of radiative fluxes from Earth in the IR domain
- SAPHIR (*Sondeur Atmosphérique du Profil d'Humidité Intertropicale par Radiométrie*):
 - water vapour profiler from 0 to 12 km altitude (around 183 GHz)



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SHARING OF RESPONSIBILITIES

C N E S	I S R O
- R F part of MADRAS	- MADRAS prime cont .
- S C A R A B equipment	- S c a n n i n g mechanism
- S A P H I R equipment	- M A D R A S A I T
- S a t e l l i t e platform	- W h o l e payload AIT
- S a t e l l i t e AIT	- D a t a mission center
- C o n t r o l center	- P S L V launch



FRENCH INDUSTRIAL DEVELOPMENTS

- MAdras Radio-Frequency EQuipment (MARFEQ) developed by Astrium Cy. (EADS group)
- SCARAB instrument developed by *Laboratoire de Météorologie Dynamique (LMD)*
- SAPHIR instrument developed by LMD + other labs.
- platform derived from the PROTEUS series developed by Alcatel Space Ind.



DATA SAMPLING & ORBIT DEFINITION

- 867 km altitude orbit with 20° inclination for up to 6 revisits a day at any location of the intertropical zone
- chosen altitude compatible with the relatively low resolution required:
 - 40 km MADRAS pixel size for 18.7-36.5 GHz range
 - 10 km MADRAS pixel size at 89 GHz
 - 6 km MADRAS pixel size at 157 GHz
- quasi real time reception of data acquired over India

CONCLUSION

- Megha-Tropiques, a model for similar co-operation projects between two space-fairing nations
- A mission to be conducted within an international recognised framework:
 - part of the thematic of the GEWEX programme
 - in continuity with the on going TRMM mission
 - in potential synergy with the next GPM mission
- Direct expected benefits for the tropical belt countries