



## **DREAMS: a payload on-board the ExoMars EDM Schiaparelli for the characterization of Martian environment during the statistical dust storm season**

Cesare Molfese (1), Francesca Esposito (1), Stefano Debei (2), Carlo Bettanini (2), Ignacio Arruego Rodríguez (3), Giacomo Colombatti (2), Ari-Matty Harri (4), Franck Montmessin (5), Colin Wilson (6), Alessio Aboudan (2), Raffaele Mugnuolo (8), Simone Pirrotta (8), Ernesto Marchetti (8), Olivier Witasse (7), and the DREAMS International Team

(1) INAF - Osservatorio Astronomico di Capodimonte, Napoli, Italy (molfese@na.astro.it), (2) CISAS - Università degli Studi di Padova, Padova, Italy, (3) INTA, Madrid, Spain,, (4) FMI - Finnish Meteorological Institute, Helsinki, Finland,, (5) LATMOS - CNRS/UVSQ/IPSL, France, (6) Oxford University, Oxford, United Kingdom, (7) ESA-ESTEC, Noordwijk, The Netherlands, (8) ASI - Italian Space Agency, Italy

F. Esposito<sup>1</sup>, S. Debei<sup>2</sup>, C. Bettanini<sup>2</sup>, C. Molfese<sup>1</sup>, I. Arruego Rodríguez<sup>3</sup>, G. Colombatti<sup>2</sup>, A-M. Harri<sup>4</sup>, F. Montmessin<sup>5</sup>, C. Wilson<sup>6</sup>, A. Aboudan<sup>2</sup>, S. Abbaki<sup>5</sup>, V. Apestigue<sup>3</sup>, G. Bellucci<sup>7</sup>, J-J. Berthelier<sup>5</sup>, J. R. Brucato<sup>8</sup>, S. B. Calcutt<sup>6</sup>, F. Cortecchia<sup>1</sup>, F. Cucciarrè<sup>2</sup>, G. Di Achille<sup>1</sup>, F. Ferri<sup>2</sup>, F. Forget<sup>9</sup>, E. Friso<sup>2</sup>, M. Genzer<sup>4</sup>, P. Gilbert<sup>5</sup>, H. Haukka<sup>4</sup>, J. J. Jiménez<sup>3</sup>, S. Jiménez<sup>10</sup>, J-L. Josset<sup>11</sup>, O. Karatekin<sup>12</sup>, G. Landis<sup>13</sup>, R. Lorenz<sup>14</sup>, J. Martinez<sup>3</sup>, L. Marty<sup>1</sup>, V. Mennella<sup>1</sup>, D. Möhlmann<sup>15</sup>, D. Moirin<sup>5</sup>, R. Molinaro<sup>1</sup>, E. Palomba<sup>7</sup>, M. Patel<sup>16</sup>, J-P. Pommereau<sup>5</sup>, C.I. Popa<sup>1</sup>, S. Rafkin<sup>17</sup>, P. Rannou<sup>18</sup>, N.O. Renno<sup>19</sup>, P. Schipani<sup>1</sup>, W. Schmidt<sup>4</sup>, E. Segato<sup>2</sup>, S. Silvestro<sup>1</sup>, F. Simoes<sup>20</sup>, A. Spiga<sup>9</sup>, F. Valero<sup>21</sup>, L. Vázquez<sup>21</sup>, F. Vivat<sup>5</sup>, O. Witasse<sup>22</sup>, R. Mugnuolo<sup>23</sup>, S. Pirrotta<sup>23</sup>, E. Marchetti<sup>23</sup>

<sup>1</sup>INAF - Osservatorio Astronomico di Capodimonte, Napoli, Italy, <sup>2</sup>CISAS - Università degli Studi di Padova, Padova, Italy, <sup>3</sup>INTA, Spain, <sup>4</sup>Finnish Meteorological Institute (FMI), Helsinki, Finland, <sup>5</sup>LATMOS - CNRS/UVSQ/IPSL, France, <sup>6</sup>Oxford University, Oxford, United Kingdom, <sup>7</sup>INAF - Istituto di Fisica dello Spazio Interplanetario (IFSI), <sup>8</sup>INAF-Osservatorio Astrofisico di Arcetri, <sup>9</sup>CNRS, LMD, France, <sup>10</sup>Universidad Politécnica de Madrid, Spain, <sup>11</sup>Space Exploration Institute, Switzerland, <sup>12</sup>Royal Observatory of Belgium, Belgium, <sup>13</sup>NASA, GRC, USA, <sup>14</sup>JHU Applied Physics Lab (JHU-APL), USA, <sup>15</sup>DLR PF Leitungsbereich, Berlin, Germany, <sup>16</sup>Open University, UK, <sup>17</sup>SwRL, Switzerland, <sup>18</sup>GSMA, France, <sup>19</sup>University of Michigan, USA, <sup>20</sup>NASA, GSFC, USA, <sup>21</sup>Universidad Complutense de Madrid (UCM), Spain, <sup>22</sup>ESA-ESTEC, Noordwijk, The Netherlands, <sup>23</sup>Italian Space Agency, Italy

DREAMS (Dust characterization, Risk assessment and Environment Analyzer on the Martian Surface) package is an integrated multi-sensor scientific payload dedicated to characterizing the landing site environment in dusty conditions. It will measure pressure, wind speed and direction, relative humidity, temperature, the solar irradiance, the dust opacity, and the atmospheric electric properties close to the surface of Mars.

It will fly in January 2016 on-board the Schiaparelli Entry, Descent and landing Demonstrator Module (EDM) of the ExoMars space mission. It is foreseen to land on Mars in late October 2016 during the statistical dust storm season. Therefore, DREAMS might have the unique chance to make scientific measurements to characterize the Martian environment in a dusty scenario also performing the first ever measurements of atmospheric electric field on Mars.

The relationship between the process of dust entrainment in the atmosphere during dust events and the enhancement of atmospheric electric field has been widely studied in an intense field test campaign in the Sahara desert. In order to better characterize this physical process, we performed atmospheric and environmental measurements comparable to those that DREAMS will acquire on Mars. Preliminary results will be discussed.

DREAMS is in a high development state. A first model has been delivered to ESA and has been integrated in the EDM Flight Model. Integration tests are on-going. The DREAMS Flight Model will be delivered at the end of March this year.