

IAF Symposium on Future Space Astronomy and Solar-System Science Missions 2019

Held at the 70th International Astronautical
Congress (IAC 2019)

Washington, DC, USA
21-25 October 2019

ISBN: 978-1-7138-1481-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2019) by International Astronautical Federation
All rights reserved.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact International Astronautical Federation
at the address below.

International Astronautical Federation
100 Avenue de Suffren
75015 Paris
France

Phone: +33 1 45 67 42 60
Fax: +33 1 42 73 21 20

www.iafastro.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

SPACE AGENCY STRATEGIES AND PLANS

PRIORITIES AND PLANS OF THE SPACE STUDIES BOARD OF THE NATIONAL ACADEMIES OF SCIENCES: REPORTS, ROUNDTABLES, AND DECADAL SURVEYS.....	1
<i>Colleen Hartman, David H. Smith, Mia Brown, Phoebe Kinzelman</i>	
BALANCING FAIR REPRESENTATION IN SCIENCE	15
<i>Carol Christian</i>	
SVOM: A FRENCH/CHINESE COOPERATION FOR A GRB MISSION	18
<i>Francois Gonzalez, Shunjing Yu</i>	
LONG-DURATION VENUS LANDER DEVELOPMENT	26
<i>Tibor Kremic</i>	
THE FUTURE OF SPACE ASTRONOMY WILL BE BUILT: RESULTS FROM THE NASA-CHARTERED IN-SPACE ASSEMBLED TELESCOPE (ISAT) STUDY	29
<i>Rudranarayan Mukherjee, Nicholas Siegler, Harley Thronson</i>	
THE SEARCH FOR EXOPLANETS: TELESCOPES FOR CHEOPS AND PLATO AND MORE	44
<i>Enrico Suetta, Enrico Battistelli</i>	
THE AFRICA2MOON PROGRAMME	45
<i>Carla Sharpe</i>	
MODIFICATIONS IN LIGO(LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY)	48
<i>Vishal Singh, Aishwerya Singh</i>	

SCIENCE GOALS AND DRIVERS FOR FUTURE EXOPLANET, SPACE ASTRONOMY, PHYSICS, AND OUTER SOLAR SYSTEM SCIENCE MISSIONS

HIGH CONTRAST OBSERVATIONS THE ALPHA CENTAURI SYSTEM AND SEVERAL SHORTCUTS TO IMAGE ANOTHER PALE BLUE DOT	49
<i>Franck Marchis</i>	
A HIGH EFFICIENT ATTITUDE REFERENCE POINTING LAW FOR CHINESE “EINSTEIN PROBE” SATELLITE	54
<i>Jianfeng Deng, Zhiming Cai, Xingbo Han, Jinpei Yu, Wen Chen, Wentao Fu, Tao Zhang</i>	
TESTING TECHNOLOGICAL AND ASTRONOMICAL SDSA/SRT CAPABILITIES FOR SOLAR AND NEAR-SUN OBSERVATIONS	61
<i>Maria Noemi Iacolina, Alberto Pellizzoni, Simona Righini, Giulia Murtas, Giuseppe Valente, Andrea Melis, Pierluigi Ortu, Franco Buffa, Elise Egron, Sara Loru, Sara Mulas, Alessandro Navarrini, Caterina Tiburzi, Alessandro Orfei, Andrea Maccaferri, Mauro Messerotti, Alessandra Zanichelli, Pietro Zucca, Raimondo Concu, Gian Luigi Deiana, Tonino Pisanu, Andrea Saba, Giampaolo Serra, Salvatore Viviano</i>	

DETECTION OF SOLAR AND JOVIAN RADIO EMISSIONS AT 20.1 MHZ WITH A DECAMETRIC RADIO TELESCOPE ARRAY	66
<i>Asmaa Alhameed, Mohamed Abdelsalam, Douae Nouichi, Ilias Fernini, Hamid Al Naimiy, Mohammad Rihan, Mohmmad Talafha, Issam Abujami, Sara Chaar, Areej Yousef</i>	
SCIENCE GOALS FOR FUTURE EXPLORATION OF THE HABITABILITY OF THE GASEOUS GIANT PLANETS' SATELLITES	68
<i>Athena Coustenis</i>	
COMPARATIVE STUDY OF IMPACT CRATERS ON EARTH AND TITAN USING RADAR.....	71
<i>Jahnvi Shah, Catherine Neish</i>	
TITAN INVESTIGATOR.....	76
<i>Lizvette Villafana, Venkata Devalaraju, Gerardo Arevalo, Josue Tobar, Casey Hanni</i>	
CUBESUB- A SUBMERSIBLE CONCEPT FOR UNDERWATER PLANETARY EXPLORATION	91
<i>Karishma Inamdar</i>	
THE INTERSTELLAR MEDIUM AND OBSERVATION OF NANODIAMONDS	92
<i>Sabrina Alam</i>	
FROST, FAR-INFRARED OBSERVATION SPECTROSCOPY TELESCOPE	129
<i>Greta De Marco, Elise Wright Knutsen, Carles Bolart, Mischa Breuhaus, Luis Estanqueiro, Cristoph Fröhlich, Maxim Guyot, Béla Hegyesi, Verner Lauksio, Selina Howalt Owe, Olga Pinzon, Oliver Price, Stefan Wagner, Ivan Zankov, Monika Ziebart, Elena López-Contreras</i>	
DARK MATTER NATURE: PROSPECTS FOR FUTURE SCIENCE MISSIONS	140
<i>Lucia Aurelia Popa</i>	
CEESA: A HABITABILITY SCORE COMPUTATION APPROACH VALIDATED BY MACHINE LEARNING	141
<i>Suryoday Basak</i>	
 <u>TECHNOLOGY NEEDS FOR FUTURE MISSIONS, SYSTEMS, AND INSTRUMENTS</u>	
PLATO (PLANETARY TRANSITS AND OSCILLATION OF STARS) FOCAL PLANE ASSEMBLY: MODELS PHILOSOPHY AND PROTOTYPE TESTS RESULTS.	152
<i>Isabel Vera</i>	
PLATO SPACECRAFT: OPTICAL BENCH DEMONSTRATOR FOR THE CHARACTERIZATION OF THERMO-ELASTIC STABILITY	153
<i>Carsten Reese, Andreas Winkler, Amir Mattaghibonab</i>	
PLATO SATELLITE POINTING PERFORMANCE - GUARANTEEING THE SATELLITE PERFORMANCE THROUGHOUT DESIGN EVOLUTIONS APPROACHING SATELLITE PDR	159
<i>Anneke Monsky</i>	
IMAGING TERRESTRIAL EXTRASOLAR PLANETS USING SUBMICRON INTERFEROMETRIC PLATFORMS.....	160
<i>Collins Ogundipe, Alex Ellery</i>	

DESIGN CONCEPTS FOR DESIGNING THE X-IFU CRYOSTAT	172
<i>Javier Gomez-Elvira, Andre Jerome, Laurent Bastide, Ivan Charles, Jean-Marc Duval, Jose Maria Encinas, Miriam Pajas, Alice Pradines, Manuel Reina, Javier San Millan, Isabel Vera, Alex Paillet, Henk Van Weers, Thien Lam-Trong, Miguel Fernandez, Almudena Garcia, Irwin Maussang, Antoine Jolly, Lorenzo Marelli, Ana Balado, Joaquin Azcue</i>	
POLARIMETER FOR HIGH-ENERGY GAMMA-RAY ASTROPHYSICS	178
<i>Branislav Vlahovic, Bogdan Wojtsekhowski</i>	
PRECISION IN-SPACE MANUFACTURING FOR STRUCTURALLY CONNECTED INTERFEROMETRY	184
<i>Simon Patané, Maxwell Fagin, Daniel Riley, Michael Snyder, John Kloske, Thorin Tobiassen, Gerard Van Belle</i>	
ENVIRONMENTAL DISTURBANCES ON MISSIONS FOR PRECISE TESTS OF RELATIVISTIC GRAVITY AND SOLAR SYSTEM DYNAMICS: THE BEPICOLOMBO CASE	191
<i>Ivan Di Stefano, Gael Cascioli, Luciano Iess, Paolo Cappuccio</i>	
CUBESAT FOR RADIO ASTRONOMY AT LOW FREQUENCIES \ (CURALF).....	200
<i>Prabhav Manchanda, Mark Ruiter, Mark Bentum, Albert-Jan Boonstra, Chris Verhoeven, David Prinsloo</i>	
LINEAR-MODE AVALANCHE PHOTODIODE ARRAYS FOR LOW-NOISE NEAR-INFRARED IMAGING IN SPACE	207
<i>James Gilbert, Alexey Grigoriev, Shanae King, Joice Mathew, Rob Sharp, Annino Vaccarella</i>	
LOW-FREQUENCY OBSERVATIONS USING HIGH-ALTITUDE BALLOON EXPERIMENTS (LOBE)	212
<i>Raj Thilak Rajan, Prem Sundaramoorthy, C. J. C. Vertegaal, Anton Montage, Visweswaran Karunanithi, Maneesh Kumar Verma, Mark Bentum, Chris Verhoeven</i>	
A LOW-POWER CMOS LOW NOISE AMPLIFIER FOR SPACE-BASED LOW-FREQUENCY RADIO ASTRONOMY	218
<i>Samaneh Babayan, Raj Thilak Rajan, Mark Bentum</i>	
<u>INTERACTIVE PRESENTATIONS - IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS</u>	
COMPLEX CHEMICAL PROFILES IN THE JWST AND ARIEL ERA.	226
<i>Quentin Changeat</i>	
PREDICTION OF ASTEROID DIAMETER WITH THE HELP OF MULTI-LAYER PERCEPTRON REGRESSOR.....	227
<i>Victor Basu</i>	
KNOWLEDGE UTILIZATION AND OPEN SCIENCE POLICIES: NOBLE AIMS THAT ENSURE QUALITY RESEARCH OR "ORDERING DISCOVERIES LIKE A PIZZA"?	228
<i>Julia Heuritsch</i>	
RADIO FREQUENCY INTERFERENCE: USING DEEP LEARNING TOOLS TO MITIGATE THE IMPACT TO SPACE OPERATIONS	235
<i>Zaid Rana, Martin Unal, Samuel Peterson, Jose Martinez Heras, Timothy Finn, Krisztina Annus</i>	

VUSE, VU AMSTERDAM UNIVERSITY/EUROMOONMARS 2018/2019 ACTIVITIES: VU SCIENCE EXPERIMENTS AT IGLUNA MOON-ICE SIMULATION HABITAT	237
<i>Bram De Winter, Bernard Foing, Marc Heemskerk, Marjolein Daeter, Amanda Kruijver, Dieke Beentjes, Bram Albers, Arlene Dingemans, Tinka Clement</i>	

Author Index