

ExoPlanet Exploration Program

Exoplanet Standard Definitions and Evaluation Team

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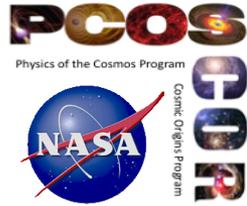
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Presentation to the LUNAR STDT Kickoff Meeting

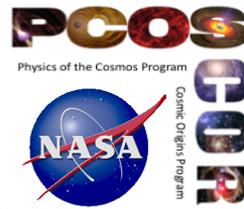


Motivation / Background

- In the 2015 run-up to chartering of large mission studies, it became obvious that likely studies (HabEx, LUVOIR) would consider overlapping science cases (e.g. spectroscopy of exo-Earths)
- The exoplanet community has had some recent experience with apple-to-oranges/apples comparisons: parallel studies, different architectures (telescope, coronagraph masks, starshades)
 - The challenge of parallel studies is to remain consistent over time
- The topic was discussed by PAGs and Senior Management: request for “common yardstick, honest broker”
- The Management Plan now includes an “Exoplanet Standard Definitions and Evaluation Team”
 - Draft charter: <https://exep.jpl.nasa.gov/reportsAndDocuments/>



Exoplanet Standard Definitions and Evaluation Team (1 of 2)



Why:

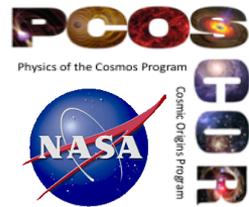
1. For APD: Science yield analyses based on transparent, unbiased, exoplanet science metrics common to both the HabEx and LUVOIR studies
 2. Document transparent, unbiased inputs, assumptions, and analysis methods common to both studies for production of these science metrics
- Program analysis tool based on module additions to Dmitry Savransky's (Cornell) open-source tool currently funded under WFIRST Preparatory Science
 - Comparison and Cross Validation with Altruistic Yield Optimization developed by Chris Stark (STScI)

What:

1. Deliver transparent and consistent definitions of input parameters, assumptions, and output metrics
2. Deliver transparent and unbiased analysis tools
3. Utilize existing diffraction propagation instrument models to accommodate specific internal and external occulters
4. Test cases to validate the models
5. Periodic comparisons to APD for science metrics, tied to interim (M4) and final (M7) STDT deliverables defined in Management Plan



Exoplanet Standard Definitions and Evaluation Team (2 of 2)



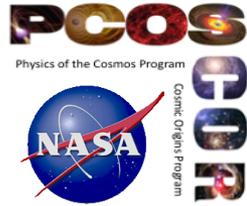
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How:

- Chartered by APD. Coordinated by ExEP for the APD/DSMT
- Small team of experts drawn NASA Centers and from the general science community:

Dr. Rhonda Morgan	Lead, NASA ExEP, JPL
Dr. Bruce Macintosh	Stanford University
Dr. Dimitri Savransky	Cornell University
Dr. Chris Stark	Space Telescope Science Institute
Dr. Avi Mandell	NASA Goddard Spaceflight Center
Dr. Ruslan Belikov	NASA Ames Research Center
Dr. John Krist	NASA Jet Propulsion Laboratory
<u>STDT Liaisons: (pending STDT chair confirmation)</u>	
Tbd	tbd (LUVOIR)
Tbd	tbd (HabEx)

- STDTs will plan for and produce their own science metrics
- ExSDET will work with STDTs to adopt science metrics and common definitions – chance to iterate with the teams
- ExoTAC (Alan Boss, Chair) will perform independent review of the ExSDET deliverables, as they have for prior comparison studies



References

- Prior Comparative Evaluations:
 - WIRST/AFTA Coronagraph WG:
 - http://wfirst.gsfc.nasa.gov/science/AFTA_Coronagraph_Arch_Selection/Coronagraph_Downselect_Rec_Dec13_2013.pdf
 - Final reports for exoplanet probes and WFIRST coronagraph:
 - https://exep.jpl.nasa.gov/files/exep/Traub2_ExoPAG_12_2015.pdf
- SAG13 on Occurrence rates for modeling:
 - <https://drive.google.com/drive/folders/0B520NCfkP4aOQUJYdmUzQTJkdkE>
- The current (draft) ExSDET Charter:
 - <https://exep.jpl.nasa.gov/reportsAndDocuments/>
 - Comments on draft charter by STDTs invited through 5/17