

## 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

**Special Session: Preliminary Look at the Chelyabinsk Event**

**Sunday, April 14, 2013**

**Chair: David Morrison**

First Scientific Session on the Chelyabinsk Bolide:

A special session on the Chelyabinsk event of February 15 will be held at the beginning of the Planetary Defense Conference in Flagstaff, AZ, April 14-19. In view of wide public and press interest in this unique meteor strike, this special session is open to the public as well as those registered at the Conference. It will be the first scientific analysis of what happened on February 15, and the implications for planetary defense generally. Organizers of the session are David Morrison, Mark Boslough, Clark Chapman, and Alan Harris. The program is held at the High Country Conference Center in Flagstaff.

1700	Conference Registration at Conference Center
1900	Special Session: Preliminary Look at the Chelyabinsk Event
1900	Opening Remarks, David Morrison, Session Chair
IAA-PDC13-10-01 1910	A Geologic and Meteoritic Perspective of Impact Airbursts and Insights into the Chelyabinsk Event <i>David Kring</i> (Lunar and Planetary Institute)
IAA-PDC13-10-02 1935	The Chelyabinsk Airburst: A Preliminary Overview of Observations <i>Peter Brown</i> (Western Ontario University)
IAA-PDC13-10-03 2005	The Trajectory and Orbit of the Chelyabinsk Impactor <i>Paul Chodas (JPL) &amp; Steven Chesley (JPL)</i>
IAA-PDC13-10-04 2025	Computational Simulations of Chelyabinsk and Tunguska Airbursts <i>Mark Boslough</i>
IAA-PDC13-10-05 2050	A Two-Week Field Study of the Chelyabinsk Impact <i>Peter Jenniskens (SETI Institute), Olga P. Popova (IDG RAS), Vadislav V. Emel'yanenko &amp; Anna Kartashova (Inst. of Astronomy RAS), Evgeny Biryukov (South Ural State Univ. Chelyabinsk), Sergey Khaibrakhmanov &amp; Alexandr Dudorov (Chelyabinsk State University), &amp; Dmitriy Glazachev (IDG RAS)</i>
2110	Panel Discussion and Audience Q&A Alan Harris, Chair

# 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

**Day 1****Monday, April 15, 2013**

0700	Breakfast
0700	Registration
0810	Morning speakers upload and check presentations
0900	Welcoming Remarks and Technical Comments, Bill Ailor
0910	Welcoming Remarks and Technical Comments, Richard Tremayne-Smith
0920	Welcome address, William Grabe, NAU Vice-President for Research
0930	IAA and Planetary Defense, Jean-Michel Contant, IAA Secretary General
0940	Concluding Remarks and Logistic Instructions, David Trilling
0945	Break

**Session 1: Background****Monday, April 15, 2013, 1000-1200****Session Chair: Paul Miller**

IAA-PDC13-01-01 1000	Historical Perspectives on Planetary Defense <i>David Morrison</i>
IAA-PDC13-01-02 1020	United Nations recommendations for an international response to the NEO impact Threat <i>Sergio Camacho</i>
IAA-PDC13-01-03 1040	The NEO Precursor Services of ESA's Space Situational Awareness Programme <i>Detlef Koschny</i>
IAA-PDC13-01-04 1100	On the National Program of Counteraction Space Threats <i>Boris Shustov</i>
IAA-PDC13-01-05 1120	NASA's Near Earth Object Program and Activities <i>Lindley Johnson</i>
IAA-PDC13-01-06 1140	Neoshield: Progress Towards an International NEO Mitigation Program <i>Alan Harris (DLR)</i>
1200	Break
1245	Afternoon speakers upload and check presentations

## 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

### Session 2: Discovering NEOs - The State of the Art

**Monday, April 15, 2013, 1315-1515**

**Session Chairs: Robert Jedicke and Alan Fitzsimmons**

IAA-PDC13-02-01 1315	Source Regions for Near Earth Objects <i>Mikael Granvik</i>
IAA-PDC13-02-02 1330	Near-Earth Object Survey Summary - The Minor Planet Center Perspective <i>Timothy Spahr</i>
IAA-PDC13-02-03 1350	The NEO Surveys <i>Don Yeomans</i>
IAA-PDC13-02-04 1410	Existing and Expected Near-Earth Object Follow-up Capabilities <i>Eileen Ryan</i>
IAA-PDC13-02-05 1430	Asteroid Terrestrial-impact Last Alert System – ATLAS <i>John Tonry</i>
IAA-PDC13-02-06 1445	NEOCAM: The Near-Earth Object CAMera <i>Amy Mainzer</i>
IAA-PDC13-02-07 1500	The Sentinel Space Telescope – Overview and Status <i>Ed Lu</i>
1515	Break

### Session 3: NEO Physical Characterization

**Monday, April 15, 2013, 1545-1820**

**Session Chairs: Alan Harris (DLR) and Line Drube**

IAA-PDC13-03-01 1545	Looking into Asteroid Interiors by Astronomical Observations <i>David Polishook</i>
IAA-PDC13-03-02 1610	Ground-based Optical Observations of NEO Fly-bys <i>Nicholas Moskovitz</i>
IAA-PDC13-03-03 1630	What do we know about Asteroid Interiors? What Matters for Mitigation? <i>Keith Holsapple</i>
IAA-PDC13-03-04 1655	The Strength of Small Rubble Pile Asteroids <i>Dan Scheeres</i>
IAA-PDC13-03-05 1715	The YORP Effect on Rubble Piles: How Centrifugal Reshaping of Small Aggregates Kills the YORP Cycle <i>Tom Statler</i>
IAA-PDC13-03-06 1735	Relevance of Asteroid Shape and Rotational Properties to Impact Mitigation Strategies <i>Ivan Debono</i>
IAA-PDC13-03-07 1755	Nuclear Deflection of PHOs as function of burst height, yield, and composition <i>Catherine Plesko</i>
1820	End Day 1
1830	Welcome reception

## 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

**Day 2****Tuesday, April 16, 2013**

0700	Breakfast
0800	Registration
0810	Morning speakers upload and check presentations

**Session 3: Continued (NEO Physical Characterization)      Tuesday, April 16, 2013, 0830-1000**

**Session Chairs: Alan Harris (DLR) and Line Drube**

IAA-PDC13-03-08 0830	Physical Properties of Near-Earth Objects from Radar Observations <i>Lance Benner</i>
IAA-PDC13-03-09 0855	Explore NEOs: The Warm Spitzer Near Earth Object Characterization Survey <i>David Trilling</i>
IAA-PDC13-03-10 0915	Orbital and Absolute Magnitude Distribution of Hazardous Objects <i>Vacheslav Emel'yanenko</i>
IAA-PDC13-03-11 0935	Impact Hazard Assessment for Asteroid 2011 AG5 <i>Paul Chodas</i>
1000	Break

**Session 4: Mitigation Techniques & Missions****Tuesday, April 16, 2013, 1030-1810**

**Session Chairs: Bong Wie, Ian Carnelli, Mariella Graziano, Brent Barbee**

IAA-PDC13-04-01 1030	The ISIS Mission Concept: an Impactor for Surface and Interior Science <i>Steve Chesley</i>
IAA-PDC13-04-02 1050	Closed Loop Terminal Guidance Navigation for a Kinetic Impactor Spacecraft <i>Shyam Bhaskaran</i>
IAA-PDC13-04-03 1110	Numerical Study of the Asteroid Deflection Efficiency of the Kinetic Impactor Approach in the NEOShield Project <i>Martin Jutzi</i>
IAA-PDC13-04-04 1130	Momentum transfer via direct impact: Experimental measurements <i>Kevin Housen</i>
IAA-PDC13-04-05 1150	Overview of Collisional-Threat Mitigation Activities at Lawrence Livermore National Laboratory <i>Paul Miller</i>
IAA-PDC13-04-06 1210	GPU Accelerated 3-D Modeling and Simulation of a Blended Kinetic Impact and Nuclear Subsurface Explosion <i>Brian Kaplinger</i>

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1230	Lunch	Jim Green or John Grunsfeld, NASA
1345	Afternoon speakers upload and check presentations	
IAA-PDC13-04-07 1400	Conceptual Design of a Flight Validation Mission for a Hypervelocity Asteroid Intercept Vehicle <i>Brent Barbee</i>	
IAA-PDC13-04-08 1420	Target selection and Mission Design Tradeoffs for a HAIV (Hypervelocity Asteroid Intercept Vehicle) Flight Validation Mission <i>Sam Wagner</i>	
IAA-PDC13-04-09 1440	Mission Opportunities for the Flight Validation of the Kinetic Impactor Concept for Asteroid Deflection <i>Sonia Hernandez</i>	
IAA-PDC13-04-10 1500	AIDA: Asteroid Impact & Deflection Assessment <i>Andy Cheng</i>	
IAA-PDC13-04-11 1520	BEAST: Low-Cost Demonstration Mission for Binary Asteroid Orbit Modification <i>Jesus Gil-Fernandez</i>	
1540	Break	
IAA-PDC13-04-12 1610	Human Expeditions to Near-Earth Asteroids: Implications for Exploration, Resource Utilization, Science, and Planetary Defence <i>Paul Abell</i>	
IAA-PDC13-04-13 1630	The Near-Earth Object Human Space Flight Accessible Targets Study: an ongoing effort to identify Near-Earth Asteroid Destinations for Human Explorers <i>Brent Barbee</i>	
IAA-PDC13-04-14 1650	Asteroid Retrieval Mission Concept - Trailblazing our Future in Space and Helping to Protect Us From Earth Impactors <i>Daniel Mazanek</i>	
IAA-PDC13-04-15 1710	OSIRIS-REx Techniques Applied to Earth-Crossing Object Deflection <i>Ron Mink</i>	
IAA-PDC13-04-16 1730	Trajectory and Mission Design for the Origins Spectral Interpretation Resource Identification Security Regolith Explorer (OSIRIS-REx) Asteroid Sample Return Mission <i>Mark Beckman</i>	
IAA-PDC13-04-17 1750	MARCOPOLO-R: ESA Sample Return Mission to 2008 EV5 (A Potentially Hazardous Asteroid) <i>Antonella Barucci</i>	
1810	End day 2	

## 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

**Day 3****Wednesday, April 17, 2013**

0810                      Speakers upload and check presentations

**Session 4: Continued (Mitigation Techniques & Missions)****Wednesday, April 17, 0830-1240****Session Chairs: Bong Wie, Ian Carnelli, Mariella Graziano, Brent Barbee**

IAA-PDC13-04-18 0830	Performance and Derived Requirements of a Gravity Tractor Serving as a Precursor to a Kinetic Impactor within the NEOSHIELD Study Framework <i>Julie Bellerose</i>
IAA-PDC13-04-19 0850	Development of an Asteroid Mission Design Software Tool for Planetary Defense <i>George Vardaxis</i>
IAA-PDC13-04-20 0910	APOPHIS Express, a Unique Opportunity for a Human Visit to a NEO in 2029 <i>Jean-Yves Prado</i>
IAA-PDC13-04-21 0930	Experimental Characterization of the Thrust Induced by Laser Ablation on an Asteroid <i>Alison Gibbings</i>
IAA-PDC13-04-22 0950	Light-Touch2: A Laser-Based Solution for the Deflection, Manipulation and Exploitation of Small Asteroids <i>Maximiliano Vasile</i>
IAA-PDC13-04-23 1010	GPU-Based Optical Navigation and Terminal Guidance Simulation of a Hypervelocity Asteroid Intercept Vehicle (HAIV) <i>Matt Hawkins</i>
1030	Break
IAA-PDC13-04-24 1100	Uncertainty Quantification in Impulsive Deflection Scenarios <i>Joe Wasem</i>
IAA-PDC13-04-25 1120	Lower Limits on NEO Deflection Velocities from Vapor and Blow-off Momentum <i>Kirsten Howley</i>
IAA-PDC13-04-26 1140	Hazardous Near-Earth Asteroid Mitigation Campaign Planning Based on Uncertain Information on Fundamental Asteroid Characteristics <i>Yohei Sugimoto</i>
IAA-PDC13-04-27 1200	Catching a Rolling Stone: Dynamics and Control of a Spacecraft and an Asteroid <i>Carlos Roithmayr</i>
IAA-PDC13-04-28 1220	Optical Navigation and Fuel-Efficient Orbit Control around an Irregular-Shaped Asteroid <i>Tim Winkler</i>
1240	Close of Session 4

# 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

All Day: Tours  
Meteor Crater

Evening: Public Event

1900 Cline Library auditorium on the campus of Northern Arizona University

Bill Nye the Science Guy, Planetary Society CEO, internationally known speaker, comedian, author, scientist, and media personality will give a presentation guaranteed to please people of all ages as he talks about the importance of protecting the planet from dangerous asteroids.

Geoff Notkin and Steve Arnold, the Science Channel's Meteorite Men, who travel all over the world, and with all kinds of gear to recovery meteorites. They will tell stories of their expeditions and what we learn about the Universe from the meteorites they recover.

The public session will be hosted by The Planetary Society's Planetary Radio Live, with plans to post the entire session online, including questions from the audience, and to air excerpts on Planetary Radio. The evening session is free to all and is sponsored by NASA and The Planetary Society.

**Day 4**

**Thursday, April 18, 2013**

0700	Breakfast
0800	Registration
0810	Morning speakers upload and check presentations

## **Session 5: Impact Effects that inform Warning, Mitigation, & Costs**

**Thursday, April 18, 0830-1230**

**Session Chairs: Mark Boslough, Alan Harris (US), Clark Chapman**

IAA-PDC13-05-01 0830	Aerial and Surface Effects of Cosmic Airbursts: Recent Events and Geological Archives <i>Marie-Agnes Courty</i>
IAA-PDC13-05-02 0845	High Velocity Impact Generated Air Blast <i>Charles Needham</i>
IAA-PDC13-05-03 0900	The NEA Impact that Created Meteor Crater, Arizona <i>David Kring</i>
IAA-PDC13-05-04 0925	Tsunami from Plume-Forming Collisional Airbursts <i>Mark Boslough</i>
IAA-PDC13-05-05 0940	Atmospheric and Water-Surface effects of small Impacts <i>Galen Gisler</i>
IAA-PDC13-05-06 1005	Assessment of Threat of Small Impacts <i>Vladimir Svetsov</i>
1020	Break

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IAA-PDC13-05-07 1050	Calculating damage from asteroid impacts <i>H. Jay Melosh</i>
IAA-PDC13-05-08 1115	Flux of Impacts in Jupiter: From super bolides to large-scale meteorites <i>R. Hueso</i>
IAA-PDC13-05-09 1130	The value of enhanced NEO surveys <i>Alan Harris (USA)</i>
IAA-PDC13-05-10 1145	Infrastructure Consequence Analysis of Destructive Events <i>Barbara Jennings</i>
IAA-PDC13-05-11 1210	NEO Disaster Response and Recovery in the Context of Other Natural Hazards <i>Clark R. Chapman</i>
1230	Lunch                  Robert J. Fenton, Jr., FEMA
1345	Afternoon speakers upload and check presentations

### Session 6: Consequence Management & Education

Thursday, April 18, 1400-1640

**Session Chairs: Victoria Friedensen, Dave Baiocchi, A.C. Charania, Nahum Melamed, Ray Williamson**

IAA-PDC13-06-01 1400	A Communications Plan for an International Response to a Threatening NEO <i>Leonard David</i>
IAA-PDC13-06-02 1420	How Scientists and Prophets have to Collaborate to face a NEO Threat <i>Jacques Arnould</i>
IAA-PDC13-06-03 1440	Assessing the Full Spectrum of Communication Needs for Potentially Hazardous NEOs <i>Margaret Race</i>
IAA-PDC13-06-04 1500	Duck! Disaster! Destruction! Challenges in communicating about near--Earth objects <i>Linda Billings</i>
IAA-PDC13-06-05 1520	A Decision Analysis Approach for Risk Management of Near Earth Objects <i>Robert Lee</i>
IAA-PDC13-06-06 1540	Organizational Vulnerability of a Crisis Organization in the Context of an Asteroid Impact: Methodology and Tools to Identify its Weak Points and Promote its Resilience <i>Emmanuel Garbolino</i>
IAA-PDC13-06-07 1600	Possible Roles for the U.S. Geological Survey in Impact Hazard Analysis and Response <i>Lazio Kestay</i>
IAA-PDC13-06-08 1620	IGMASS – Planetary Market of Knowledge without Linguistic, National or Cultural Borders <i>Efim Malitkov</i>
1640	Break

## **2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM**

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### **Introduction to Session 7**

**Thursday, April 18, 1710-1800**

**Chairs: Debbie Lewis, LtCol. Peter Garretson, L.A. Lewis**

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1710	Scenario Briefing	Don Yeomans
1730	First injects	Debbie Lewis
1800	End of day 4	

Day 4 evening: Conference Banquet with a few words from a special guest: Carolyn Shoemaker

1900	Cocktail	
1930	Banquet	

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### **Day 5**

**Friday, April 19, 2013**

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0700	Breakfast	
0800	Registration	
0825	Welcoming Remarks	Bill Ailor

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### **Session 7: Mitigation Response and Disaster Management Exercise**

**Friday, April 18, 0830-1230**

**Session Chairs: Debbie Lewis, LtCol. Peter Garretson, L.A. Lewis**

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0830	Start of exercise	Debbie Lewis
1030	Group Reports	All
1130	Exercise Debrief	Debbie Lewis
1230	Lunch	

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### **Session 8: Panel Session & Discussion: Preparing the White Paper**

**Friday, April 18, 1345-1530**

**Moderator: William Ailor and Session Chairs representing each Session**

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1345	Summary from Session Chairs & Discussion	Bill Ailor
1500	Final Remarks – Conclusions & announcement of 2015 venue	
1530	End of Conference	

# 2013 IAA PLANETARY DEFENSE CONFERENCE

## PROGRAM

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### Poster Session

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- IAA-PDC13-01-01P Neodydys: Recent Past, Present and Future of Impact Monitoring Activities  
*F. Bernardi, F. Spoto, D. Farnocchia and A. Milani*
- IAA-PDC13-01-02P A New Business Plan for Planetary Defense  
*M. Boslough*
- IAA-PDC13-02-01P A Sensitive Search for NEOs with the Dark Energy Camera  
*L. Allen, D. Trilling, T. Axelrod, C. Fuentes, D. James, F. Valdes, B. Burt, A. Earle, D. Herrera, S. Larson, E. Christensen, A. Gibbs, M. Trueblood, M. Brown*
- IAA-PDC13-02-02P The Shoemaker NEO Grant Program a Resource for Observers  
*B. Betts*
- IAA-PDC13-02-03P The Dark Energy Camera Near Earth Asteroid survey: Simulations and object linking  
*B. Burt, A. Earle, C. Fuentes, D. Trilling, L. Allen*
- IAA-PDC13-02-04P Status of the Catalina Sky Survey  
*E. Christensen, S. Larson, A. Boattini, A. Gibbs, A. Grauer, R. Hill, J. Johnson, R. Kowalski, R. McNaught, F. Shelly*
- IAA-PDC13-02-05P Inventorying the Number of Potential Impactors in the Inner Solar System in the Diameter Range 10m to 100m with Interplanetary Spacecraft  
*G.L. Delzanno, H.R. Lai, C.T. Russell*
- IAA-PDC13-02-06P Optimizing A Wide Survey For Neos  
*G. Drolshagen, D. Koschny, T. Albin, L. Cibin, M. Chiarini*
- IAA-PDC13-02-07P Searching for the most dangerous near Earth asteroids in archival STEREO data  
*C. Fuentes, D. Trilling, M. Knight*
- IAA-PDC13-02-08P The NEOWISE Survey of the Near-Earth Asteroids  
*T. Grav, A. Mainzer, J. Bauer, R. Cutri, J. Masiero*
- IAA-PDC13-02-09P Population of NEAs and Survey Completion  
*A.W. Harris*
- IAA-PDC13-02-10P The Astrometry Algorithm Used at the Klet Observatory  
*M. Honkova, M. Tichy, J. Ticha, M. Kocer*
- IAA-PDC13-02-11P Detecting sub-kilometer NEOs with ATLAS & PS2  
*R. Jedicke, E. Schunova, P. Veres, L. Denneau, R.J. Wainscoat, J. Tonry*
- IAA-PDC13-02-12P Discovery of Human Exploration Candidates with Sentinel  
*R. Linfield, H. Reitsema, Ed Lu, M. Buie*
- IAA-PDC13-02-13P Potentially Hazardous Long-Period Comets: Warning Times  
*L. Phelps, D.C. Boice*
- IAA-PDC13-02-14P Lincoln Near Earth Asteroid Research Program: 2013 and Beyond  
*R. Y. Shah, D. Woods, E. Pearce, J. Scott Stuart, G. Stokes*

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- IAA-PDC13-02-15P A Concept of Cost-Saving Space System Designed for the Detection of NEO's  
*A. Shugarov, B. Shustov, M. Martynov, V. Kudryashov*
- IAA-PDC13-02-16P Resonant Returns and Possible Collisions of Asteroids with the Earth  
*L.L. Sokolov, T.P. Borisova, N.A. Petrov, A.A. Vasiliev*
- IAA-PDC13-02-17P Study of Celestial Bodies Motion Presenting Impact Risk with the Earth  
*I. Stroe, Ml. Piso, A. Craifaleanu*
- IAA-PDC13-02-18P The Gaia ground-based follow-up network Gaia-FUN-SSO  
*W. Thuillot, D. Bancelin, P. Tanga, J. Hestroffer, D. Berthier, B. Carry, P. David, P. Rocher, and the Gaia-FUN-SSO team*
- IAA-PDC13-02-19P Inaccuracies Affecting the Calculation of Orbital Elements  
*M. Tichy, M. Honkova, J. Ticha(1), M. Kocer*
- IAA-PDC13-02-20P A Space Mission to Detect Imminent Earth Impactors  
*G.B. Valsecchi, E. Perozzi, A. Rossi*
- IAA-PDC13-02-21P Automatic Detection of Asteroids and Meteoroids – Wide Field Survey  
*P. Vereš, J. Tóth, R. Jedicke, J. Tonry, L. Denneau, R. Wainscoat, L. Kornoš, J. Šilha*
- IAA-PDC13-02-22P The Pan-STARRS1 search for Near-Earth Asteroids - present status and future plans  
*R. Wainscoat, L. Denneau, R. Jedicke, P. Veres, B. Bolin*
- IAA-PDC13-02-23P Prospects for detection of Potentially Hazardous Asteroids in the sweet spots  
*R. Wainscoat, L. Denneau, R. Jedicke, P. Veres, B. Bolin*
- IAA-PDC13-02-24P A Large Optical Arecibo for NEO Discovery  
*D. Steel, H. Steel*
- IAA-PDC13-02-25P Triangulation of Near Earth Objects by Earth Based Observers  
*S. Eggl*
- IAA-PDC13-02-26P Spacewatch Followup Observations of Hazardous Near-Earth Objects  
*R. S. McMillan, T. H. Bressi, J. V. Scotti, J. A. Larsen, M. L. Perry*
- IAA-PDC13-02-27P NEO Monitoring Using the World's Largest Schmidt-Camera  
*B. Stecklum*
- IAA-PDC13-02-28P Offers on Creation of the International Planetary Defence System "Citadel"  
*V.V. Adushkin*
- IAA-PDC13-02-29P Charming Asteroids & Comets  
*D. Scheld*
- IAA-PDC13-02-30P Basic Asteroid Explorer (BAse)  
*W. Wittholt*
- IAA-PDC13-02-31P The pilot Warm Spitzer Near Earth Object Discovery Survey: Probing the size  
*D. Trilling, M. Delbo, J. Emery, G. Fazio, C. Fuentes, A. Harris, J. Hora, M. Mommert, M. Mueller, H. Smith*
- IAA-PDC13-03-01P The Need for NEO Close Mapping and Characterization  
*B. Archinal, R. Kirk, K. Edmundson, M. Rosiek, L. Gaddis, A. Nefian, T. Fong, R. Beyer, J. Bellerose*

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- IAA-PDC13-03-02P Framework to Assess the Micrometeoroid Flux Increase Due to Nuclear Surface Asteroid Deflection and the Threat Posed to Space Assets  
*E. Aretskin-Hariton, K. Abercromby*
- IAA-PDC13-03-03P Low Cost Characterization of Seismic Attenuation in Potentially Hazardous Asteroids  
*E. Asphaug*
- IAA-PDC13-03-04P Orbit Propagation of Asteroid (99942) Apophis From Recent Observations  
*D. Bancelin, D. Hestroffer, W. Thuillot*
- IAA-PDC13-03-05P Short Term Impact Risk Assessment for Asteroid 2011 Ag5  
*D. Bancelin, P. Pravec, M. Nolan*
- IAA-PDC13-03-06P Dynamical evolution and physical properties of six NEAs  
*M. Birlan, A. Nedelcu, M. Popescu*
- IAA-PDC13-03-07P Hazard Assessment for 101955 (1999 Rq36), the OSIRIS-REx Mission Target  
*S.R. Chesley, D. Farnocchia, P.W. Chodas, D. Vokrouhlicky, F. Spoto, A. Milani, G.B. Valsecchi*
- IAA-PDC13-03-08P NEOshield - The Physical Properties of the Most Frequent Impactors  
*L. Drube, A. W. Harris, A. Barucci, M. Fulchignoni, D. Perna*
- IAA-PDC13-03-09P Scaling Near Earth Asteroid Characterization Rates  
*M. Elvis, C. Beeson, J.L. Galache*
- IAA-PDC13-03-10P Yarkovsky Driven Impact Predictions: Apophis and 1950 DA  
*D. Farnocchia, S. R. Chesley, P. W. Chodas, A. Milani*
- IAA-PDC13-03-11P Choosing NEO Mission Targets Current Knowledge and Future Earth-Based Observation Opportunities  
*A. Fitzsimmons, A. W. Harris, S. Eggl, D. Perna*
- IAA-PDC13-03-12P Tangential Yorp Effect  
*O. Golubov, Y. N. Krugly*
- IAA-PDC13-03-13P Physical Properties of Meteoroids According to Middle and Upper Atmosphere Radar Measurements  
*M. Gritsevich, J. Kero, J. Virtanen, C. Szasz, T. Nakamura, J. Peltoniemi, D. Koschny*
- IAA-PDC13-03-14P The Physical Nature of Small Earth-Approaching Asteroids  
*W. K. Hartmann, O. Popova*
- IAA-PDC13-03-15P Apophis 2029 Mission, CNES Engineering Study  
*E. Hinglais, L. Lopes, JY. Prado, Apophis Mission Science group, CNES team*
- IAA-PDC13-03-16P The Role of Radar Astronomy in Assessing and Mitigating the Asteroid Impact Hazard  
*JL. Margot*
- IAA-PDC13-03-17P Assessments of blast deflection of asteroids  
*S.A. Meshcheryakov, Yu. M. Lipnitsky*
- IAA-PDC13-03-18P Constraints on Densities of Small Neos from Radiation Pressure Detections  
*M. Micheli, D. J. Tholen, G. T. Elliott*

## 2013 IAA PLANETARY DEFENSE CONFERENCE PROGRAM

- IAA-PDC13-03-19P A new program to determine asteroid thermal properties  
*C. R. Nugent, A. Mainzer, J. Masiero, T. Grav, J. Bauer*
- IAA-PDC13-03-20P Distribution of Spin-Axis Longitudes for NEAs and MBAs  
*D. Oszkiewicz, S. Breiter, T. Michałowski, E. Bowell, L. Wasserman, K. Muinonen, A. Marciniak*
- IAA-PDC13-03-21P The metric spaces and its applications for NEO Characterization  
*Peng Zhang, Junfeng Li, Chen Yang, Hongwei Yang*
- IAA-PDC13-03-22P Laboratory Spectrometry of Meteorite Samples at Visible to Near-Infrared Wavelengths  
*H. Pentikäinen, A. Penttilä, K. Muinonen, T. Hakala, J. Peltoniemi, M. Gritsevich*
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- IAA-PDC13-03-24P Physical Characterization Studies of Potentially Hazardous Near-Earth Objects  
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- IAA-PDC13-03-25P Proper Elements, Asteroid Families, Resonances and the Origin of Near Earth Asteroids  
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