

# CCSDS LINK

A QUARTERLY NEWSLETTER

VOLUME 3 ISSUE 1 — MARCH 2008

## CCSDS in the News

Read about three instances of CCSDS specifications contributing to mission success.

[Page 2](#)

## March 2008 Meeting Information



Find all of the latest meeting information and logistics details for the March 2008 Technical Working Group Meetings in the Washington, D.C. area.

[Page 3](#)

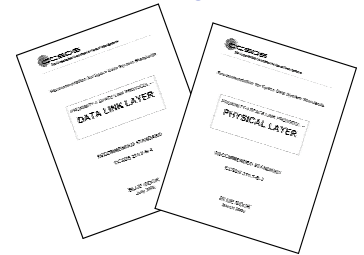
## For Your Information

We've gathered information on a number of upcoming meetings that you may find of interest.

[Page 7](#)

## New and noteworthy

Take a look at the CCSDS documents that have recently been published or released for formal review. [Page 9](#)



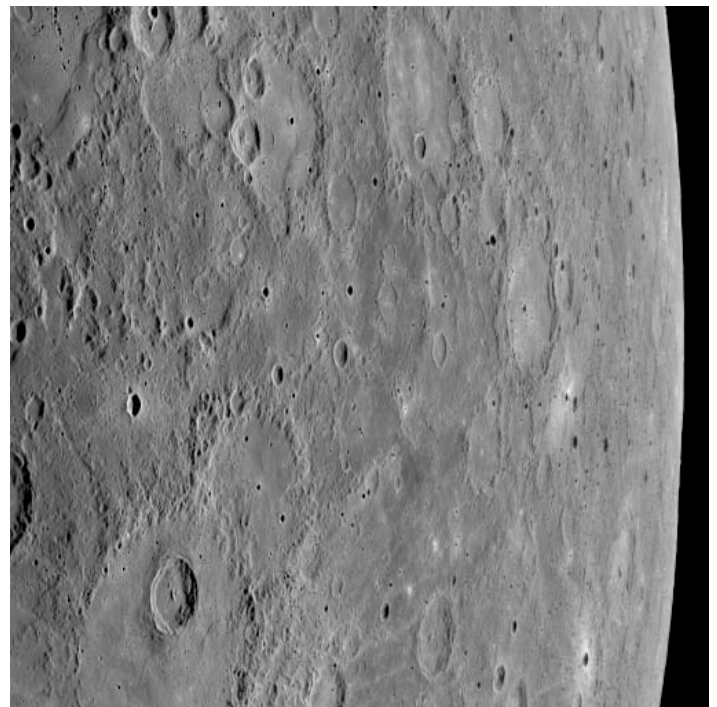
## Welcome to the CCSDS Link

The *Link* is intended to serve as a communication forum for the CCSDS community. Through content developed by CCSDS technical experts, members of the CMC and CESG, and by secretary staff we hope to provide readers with a wealth of information about the organization and its work. Information in the *Link* is aimed at CCSDS participants as well as users of CCSDS specifications and technical information.

In this issue of the newsletter readers will find information about the next set of CCSDS technical meetings being held in the Washington, D.C. area on 10-14 March. Please be sure to take note of the details on the meeting venue location and how to get there from the airport before you begin your travels. There is also information about two workshops being planned by the SM&C WG to occur during the meeting week. We've also included a Washington, D.C. metropolitan area subway map that you can print out and bring with you should you not be familiar with this public transportation system.

CCSDS specifications have also been instrumental in a number of recent missions. We've tried to capture some details about the achievements and how CCSDS contributed to success starting on page 2. If we have missed something, please let us know and we'll include an article in our next issue. Also, please don't forget to inform the secretariat staff when there is a CCSDS-related news item in your area of expertise. We want to help publicize the success of the work done in CCSDS.

We look forward to welcoming nearly 200 CCSDS experts to the Washington, D.C. area in March. Please travel safely and do not hesitate to contact the secretariat should you require any assistance.



Just nine minutes after the MESSENGER spacecraft passed 200 kilometers (124 miles) above the surface of Mercury, its closest distance to the planet during the January 14, 2008, flyby, the Wide Angle Camera (WAC) on the Mercury Dual Imaging System (MDIS) snapped this image. This view is from the first set of images taken following MESSENGER's closest approach with Mercury. See the story below to learn how CCSDS is contributing to the success of this mission.

Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington

## Secretariat Update

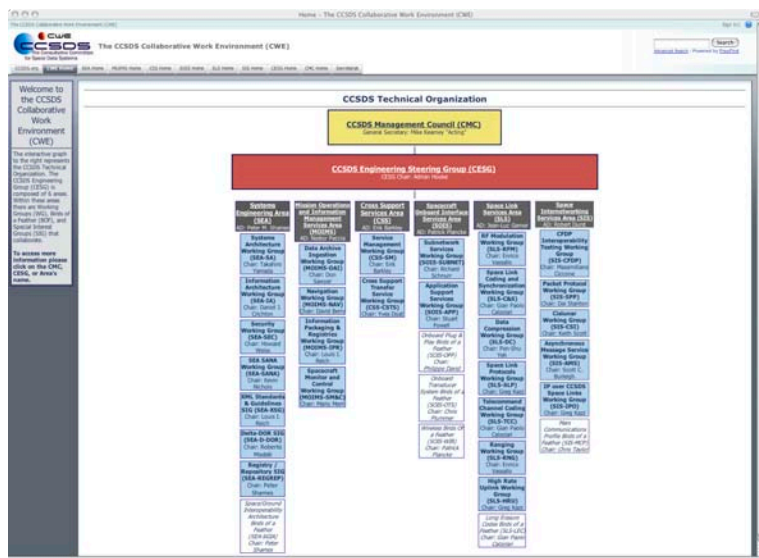
The CCSDS Secretariat staff continues to work to bring more efficiency and online tools to the CCDSS working groups. An online charter development system has been in development for the last several months. The initial results were presented to the CESC and CMC during their meeting in Germany in October 2007. Since then a number of refinements have been made. We've also done our best to accommodate as many of the functionality requests as possible. We have begun to populate the system with existing charters and will be ready to demo the system to WG chairs and other interested parties during the working group meetings this month. We hope to be able to deploy the system for use following those demonstrations.

Another big project undertaken by our IT staff was the design and implementation of a new online meeting registration system that was used for the March meetings. This new system was designed to enhance the large task of planning our meeting cycles by forcing meeting participants to only register for a single meeting during a given meeting period. This new functionality has allowed us to better size meeting rooms throughout the week in order to best accommodate the numerous meeting room requests we receive.

The next big task to be undertaken by our IT staff will be the design and development of an online RID tool to be used for reviewing and commenting on draft documents. It is hoped that this tool will allow greater visibility and tracking of the review process.

Another project is attempting to define checklists for the numerous repetitive tasks we perform on a regular basis to ensure documentation exists for our critical processes. Such tasks include approving new WG leads, establishing new WGs, putting documents through the appropriate review cycles, etc.

Of course, we continue to support the day to day work of the CESC, CMC, ISO TC20/SC13, and the CCSDS working groups. To contact the secretariat, simply send an email to [secretariat@mailman.ccsds.org](mailto:secretariat@mailman.ccsds.org).



## CFDP Goes "Across The Universe"



On 4 February 2008 NASA, for the first time ever, beamed a song directly into deep space. The song, The Beatles' "Across the Universe", was transmitted over NASA's Deep Space Network (DSN) 40 years to the day following the song's recording.

From what we understand, the transmission was accomplished using numerous CCSDS protocols. The audio file was encoded using the CCSDS File Delivery Protocol (CFDP). The CFDP Protocol Data Units (PDUs) were then wrapped in standard CCSDS Telecommand frames/coding. Space Link Extension (SLE) services were used to transfer the Communications Link Transmission Units (CLTUs) to the DSN ground station in Madrid.

The transmission was aimed at the North Star, Polaris, which is located 431 light years away from Earth. The song will travel across the universe at a speed of 186,000 miles per second. Former Beatle Sir Paul McCartney expressed excitement that the tune, which was principally written by fellow Beatle John Lennon, was being beamed into the cosmos.

"Amazing! Well done, NASA!" McCartney said in a message to the space agency. "Send my love to the aliens. All the best, Paul."

Lennon's widow, Yoko Ono, characterized the song's transmission as a significant event.

"I see that this is the beginning of the new age in which we will communicate with billions of planets across the universe," she said.

For a news story regarding the transmission (with CFDP explicitly mentioned) please direct your web browser to: [http://public.ccsds.org/pressroom/OtherHeadlines/flowplayer/html/atu\\_a.spx](http://public.ccsds.org/pressroom/OtherHeadlines/flowplayer/html/atu_a.spx)

## MESSENGER Returns Historic Images of Mercury

A day after its successful flyby of Mercury, the MESSENGER spacecraft turned toward Earth on Tuesday, 15 January and began downloading the 500 megabytes of data that had been stored on the solid-state recorder during the encounter. All of that data, including 1,213 images from the Mercury Dual Imaging System (MDIS) cameras, have now been received by the Science Operations Center at the Johns Hopkins University Applied Physics Laboratory in Laurel, MD. Preliminary analysis of the data by the MESSENGER Science Team has confirmed that all seven MESSENGER instruments are healthy and operated as planned during the flyby.

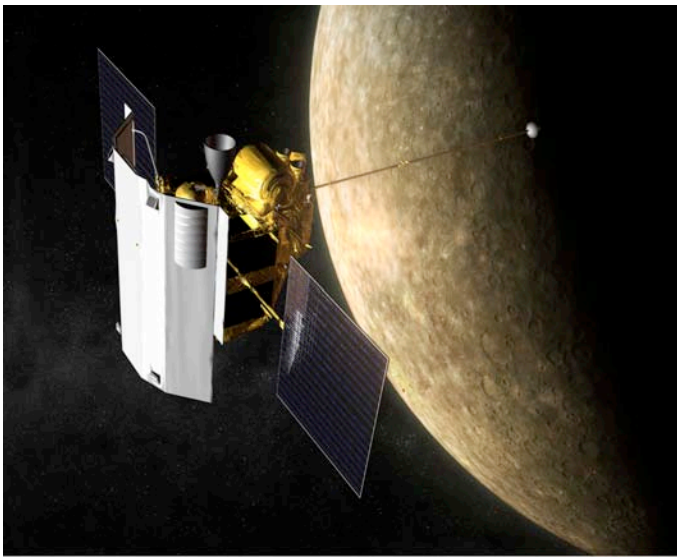
([http://messenger.jhuapl.edu/news\\_room/details.php?id=41](http://messenger.jhuapl.edu/news_room/details.php?id=41))

MESSENGER uses an onboard file system to collect and store this wealth of scientific information. Data from these files is telemetered following the the CCSDS File Delivery Protocol (CFDP). CFDP was developed for file transfer across interplanetary distances. CFDP is an FTP-like file transfer protocol

that is optimized for the challenging communications properties of spacecraft that are operating outside of geosynchronous orbit with long link delays (> 10 s) and asymmetric bandwidth (> 100/1 down/up).

CFDP was designed to function reliably despite the long data propagation delays and frequent, lengthy interruptions in connectivity found in deep space. It uses powerful forward error correction coding that minimizes data loss in communication across deep space, and also supports optional "acknowledged" modes of operation in which data loss is automatically detected and a retransmission of the lost data is automatically requested.

Other CCSDS standards are also being utilized on the MESSENGER spacecraft, including the space packet protocol and the telemetry and telecommand link protocols. Utilization of these different standard protocols allows the spacecraft to be operated by the Johns Hopkins University's Applied Physical Laboratory, while communications with the spacecraft are conducted through the NASA Deep Space Network.



(Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington)

## CCSDS Enables Interoperability Between Europe and China

Space communications protocols developed by the international Consultative Committee for Space Data Systems (CCSDS) were recently employed to achieve a first-ever cooperation between the Chinese National Space Administration (CNSA) and the European Space Agency (ESA). Beginning November 1, ESA satellite tracking stations received telemetry signals from the CNSA spacecraft Chang'e 1 and transmitted telecommands back to the lunar-orbiting satellite.

Launched by CSNA on October 24, 2007, the Chang'e 1 satellite successfully achieved lunar orbit on November 5 and returned its first picture of the lunar surface on November 20. The spacecraft represents the first lunar exploration mission launched by CNSA. Orbiting 200 km above the lunar surface, Chang'e 1 is designed to obtain three-dimensional stereo images of the moon, to analyze the elemental make-up of the surface, and to survey the depth of the lunar soil. Additionally, the spacecraft is intended to explore the space environment be-

tween Earth and its moon, taking solar wind measurements during the Earth-moon transit phase of the mission.

The payload data management system aboard the Chang'e 1 satellite used to collect, process, store, and transmit the data of the multiple scientific payloads, utilizes CCSDS Advanced Orbiting Systems protocols to encapsulate stored and real-time scientific data for transmission to ground stations. The use of these internationally recognized and implemented standards allows the data to be processed by multiple ground networks around the world. The exercise between CNSA and ESA proves the value of international standards by enabling cross-support of one agency's mission by another.

Mike Kearney, CCSDS Management Council chair, remarked "This collaboration between CNSA and ESA really demonstrates the payoff of international space standardization." Kearney continued, "Most in the industry recognize that future missions and programs will require international cooperation, often as part of a long-range program plan, but sometimes to deal with unexpected operational contingencies. International interoperability and cross-support will be essential, and it will only happen if agencies develop the agreements well in advance, in forums like CCSDS."

The international space agency members of CCSDS continue to support and pursue standardization of space data and information transfer systems. The specifications used to enable this example of inter-agency cross-support were originally developed nearly twenty years ago. They have been continuously refined and updated to support state-of-the-art communication advances and will serve as the foundation of future international missions along with the many other protocols developed by CCSDS.



# March 2008 CCSDS Meetings

*Working Group meetings in Washington D.C., USA*

The next meetings of the CCSDS technical working groups will be held 10-14 March 2008 in Arlington Virginia, just across the river from Washington, D.C. Hosted by NASA, the meetings will be co-located with the OMG Technical Meeting.

Detailed information about the meetings, the venues, and the city is below to aid in planning your stay in the Washington, D.C. area. For the most complete and up-to-date information, please consult the CCSDS website.

An interactive map of the area around the meeting venue can be found [here](#).

## **10-14 March 2008, Arlington, VA, USA**

The Marriott Courtyard Arlington Crystal City/Reagan National Airport hotel will be the primary meeting venue, with overflow rooms at the Hyatt Regency Crystal City hotel (located next door to the Marriott). Meeting rooms will have wireless internet access available and NASA will provide morning and afternoon coffee breaks. Participants will be responsible for their own lunches. A number of local lunch options are listed on the [map](#) with contact information available [here](#).

Please note that there are also other Marriotts in Crystal City that are not the Courtyard, and other Courtyards in Arlington that are not the Courtyard Arlington Crystal City. Participants should make sure that their ground transportation from the airport take them to the Courtyard Arlington Crystal City at 2899 Jefferson Davis Highway, Arlington VA.

The Marriott hotels have several free shuttles that take passengers between the Reagan National Airport (DCA) and the hotel. It picks up passengers at Terminal A or at Terminal B (for Terminal B go to doors 5 or 9 at the baggage claim area). Make sure you get on the correct Shuttle for the Courtyard Arlington Crystal City. The van you are looking for is the Red and White van that says "Residence Inn, Crystal City Marriott, Crystal Gateway". We recommend that when you get on, you check that it is going to the Crystal City Courtyard Marriott. It runs every 15 minutes but only from 06:00 to 23:00.

You can also take the Metro (Washington D.C. area subway system) from the airport to the Crystal City Station, but the walk from the Crystal City Station to the hotel is about 9 blocks, about 15 minutes. There is a free shuttle from the Metro station entrance, but is available only on request.

This [link](#) indicates the locations of the Metro station, the meeting venue, and numerous local eating options.

Registration for the meetings will open at 07:00 on Monday, 10 March in the foyer of the Marriott.

**Please be aware that Daylight Savings Time begins in the United States on 9 March 2008 (while in Europe it will start on 30 March 2008). Please adjust your schedules and clocks accordingly!**

The opening plenary session will begin promptly at 08:00 on Monday and is scheduled to last approximately 90 minutes, af-

ter which the working group meetings will begin. The current meeting room schedule is presented below. Any changes will be distributed with registration packages as we continue to refine things to best suit the needs of the working groups.

Currently available agendas for all of the meetings are available at this [website](#).

### Special Workshops

On March 12 2008, the CCSDS Spacecraft Monitoring & Control (SM&C) group will host the 1st SM&C Users Workshop. On March 13 2008, the CCSDS Spacecraft Monitoring & Control group and the OMG Space Domain Task Force will host the 2nd XTCE Users Workshop.

The 1<sup>st</sup> SM&C Users Workshop will consist of presentations, demos and a questions & answer session on SM&C. As you may know, the SM&C initiative aims at defining a service oriented architecture framework where an expandable set of M&C services could seamlessly plug-in. The purpose of the meeting is to bring together the SM&C user community and to share experiences and ideas.

The 2<sup>nd</sup> XTCE Users Workshop will consist of presentations, demos and a questions & answer session on XTCE modeled after the successful 1<sup>st</sup> XTCE Users Workshop held in Germany in October of 2007. The purpose of the meeting is to bring together the XTCE user community and to share experiences and possibly tools.

### About the Meeting Location

Crystal City is an urban neighborhood in the southeastern corner of Arlington County, Virginia. Just south of downtown Washington, D.C., Crystal City is centered along a stretch of Jefferson Davis Highway (U.S. Route 1), just south of The Pentagon, just east of Pentagon City, and within walking distance to the west of Ronald Reagan Washington National Airport. Characterized as one of many "urban villages" by Arlington County, Crystal City is almost exclusively populated by high-rise apartment buildings, corporate offices, hotels, and numerous shops and restaurants. There is also an extensive network of underground shopping areas and connecting corridors beneath Crystal City.

Though it was not intended as a planned community, it unfolded that way after construction began on the first condominiums and office buildings in 1963. The name "Crystal City" came from the first building, which was called Crystal House and had an elaborate crystal chandelier in the lobby. Every subsequent building took on the Crystal name (i.e., Crystal Gateway, Crystal Towers), and eventually the whole neighborhood. Crystal City is largely integrated in layout and extensive landscaping, as well as the style and materials of the high rise buildings, most of which have a speckled granite exterior.

Due to Crystal City's extensive integration with both office buildings and residential high-rise buildings, it is possible for most residents living to the east of Route 1 to traverse from one end

to the other (roughly north-south), performing any shopping or dining along the way, entirely underground, thus making Crystal City an underground city. This is of particular importance during inclement weather. During the winter months, it can reach temperatures of the low teens (fahrenheit), and snow storms and heavy rains are possible. Additionally many of the high-rise apartment buildings are structured such that they have internal hallways with horizontally opposed apartments, forcing neighbors to interact with each other more so than would be in an "open" building.

Crystal City presently has over 6,000 residents, while around 60,000 come to work there every weekday. It was home to the United States Patent and Trademark Office until mid-2005, when it moved to nearby Alexandria. It also has offices of the United States Department of Labor, and many satellite offices for The Pentagon, which is currently being renovated.

The layout of Crystal City was considered avant-garde back when it was built, with superblocks bounded by arterial and circulating roads, and with pedestrian traffic and the businesses serving it relocated from the streets to the pedestrian tunnels. However, as of 2005, Crystal City is being redesigned to give it a more traditional, urban feel, with restaurants at street level, and with traffic patterns changed to make streets like Crystal Drive function as city streets, rather than as circulating roads. Additionally, many office buildings in Crystal City have shed their original names (e.g. Crystal Square, Crystal Mall, Crystal Gateway) in favor of traditional street addresses, and signage in the Crystal City underground has been updated with the new building names, and directions to surface streets. Many local residents still use the original building names, which causes problems for non-locals since the signage and maps do not include them.

(taken from [http://en.wikipedia.org/wiki/Crystal\\_City,\\_Virginia](http://en.wikipedia.org/wiki/Crystal_City,_Virginia))

The Crystal City subway station serves the meeting area and provides meeting attendees the opportunity to experience all that the Washington D.C. metropolitan area has to offer via simple, intuitive public transportation. A map of the Metrorail system is included below to aid in your travel planning needs.

CCSDS Spring 2008 WG Meeting Schedule - 10-14 March 2008 (3/4/08)

Foyer	Foy	Chesapeake	Ches
Boardroom	Board	Room 1406	1406
Club Room	Club	Room 1411	1411
Shenandoah	Shen	Room 1418	1418
Piedmont	Pied	Hyatt - Room 1801	H1801
Potomac	Pot	Hyatt - Room 1803	H1803
Mt. Vernon	MtV	To be determined	TBD
Blue Ridge	Blu		

	Mon - 08:00 - 09:00	Mon - 09:00 - 12:00	Mon - 13:00 - 17:00	Tue - 08:00 - 12:00	Tue - 13:00 - 17:00	Wed - 08:00 - 12:00	Wed - 13:00 - 17:00	Thu - 08:00 - 12:00	Thu - 13:00 - 17:00	Fri - 08:00 - 12:00	Fri - 13:00 - 17:00	17:00 - 18:30
<b>CCSDS</b>												
Registration	Foy	Foy	Foy									
CCSDS Plenary	Club	Club										
<b>Systems Engineering Area</b>												
SEA Plenary		MtV									MtV	
System Architecture WG			MtV									
Security WG				MtV	MtV	Shen	Shen					
Info Arch WG										TBD		
SANA WG										1411		
DDOR WG				TBD	TBD	TBD	TBD					
XSG SIG											1406	
Timecode BoF			1411									
<b>Mission Ops and Info Mgt Svcs Area</b>												
MOIMS Plenary		Club										Club
Data Archive Ingestion WG		Pied	Pied	1418	1418	MtV	MtV	1418	1418	1406		
Navigation WG		Shen	Shen	Board	Board	1411	1411	1411	1411	Pied		
SEA IA + IPR Meeting							Board	Board	Board			
Info Packing and Registries WG											Shen	
Spacecraft Monitor & Ctrl WG		Club	Club	Blu	Blu	Blu	Blu	Blu	Blu	Club	Club	
<b>Cross Support Services Area</b>												
CSS Plenary		Shen									Ches	
Service Management		Blu	Blu	Pied	Pied	Ches	Ches	Shen	Shen	Blu	Blu	
Cross Supt Transver Svcs WG		1406	1406	TBD	TBD	TBD	TBD	Pot	Pot	1418	418	
Cross Supt Architecture BOF					1406			TBD				
<b>Spacecraft Onboard I/F Svcs Area</b>												
SOIS Plenary										Shen		
SOIS WG (Subnetwork & Application Support Services WG)				Shen	Shen	Pot	Pot	MtV	MtV			
Wireless WG					1411	1406	1406	TBD				
<b>Space Link Services Area</b>												
SLS Plenary											Pied	
Space Link Code/Sync WG (includes TCC/HRU/LEC)						Pied	Pied	Pied	Pied	Ches		
Space Link Protocols WG		Ches	Ches									
High Rate Uplink WG				Ches	Ches							
Multispectral & Hyperspectral Data Compression WG				Pot	Pot	1418	1418	1406	1406			
<b>Space Internetworking Services Area</b>												
SIS Plenary										MtV		
Async Messaging Service WG		Board	Board									
Mars Communication Profile WG						Board						
Voice BOF				1406		H1803						
Motion and Imagery Applications BOF			1418		H1801							
DTN BOF								Ches	Ches			
<b>Workshops</b>												
1st SM&C Users Workshop						Blu	Blu					
2nd XTCE Users Workshop								TBD	TBD			
<b>CESG Wrap Up Session (CESG Members Only)</b>												1411

# M System Map

Metro Opens Doors.com  
 Customer Information Service: 202/637-6000  
 TTY Phone: 202/638-3780

- Legend**
- Red Line • Glenmont to Shady Grove
  - Orange Line • New Carrollton to Vienna/Fairfax-GMU
  - Blue Line • Franconia-Springfield to Largo Town Center
  - Green Line • Branch Avenue to Greenbelt
  - Yellow Line • Huntington to Fort Totten



Metro is accessible.

- No Smoking
- No Eating or Drinking
- No Animals (except service animals)
- No Audio (without earphones)
- No Litter or Spitting
- No Dangerous or Flammable Items

## For Your Information

### Save the Date for Future CCSDS Meetings

Hosted by JAXA, the Spring 2008 CESG/CMC/SC 13 meetings will be held at JAXA Headquarters in Tsukuba, Japan in June 2008. The dates are currently being finalized by the CMC and will be announced as soon as possible. Additional details regarding the meetings will be posted as they become available.

For purposes of your advanced planning, we are currently planning to hold the Fall 2008 CCSDS meeting series in Berlin, Germany, at the DIN facilities. Location information is [here](#): (German only) or in Google Maps [here](#).

The planned schedule for technical meetings is:

- CCSDS Technical Plenary: 13-17 October 2008

The following week will be the management meetings:

- CESG: 20 October 2008
- SC13: 20 October (p.m.) 2008
- CESG/CMC joint meeting: 21-22 October 2008
- CMC wrap-up: 23 October 2008

The meetings will be hosted by DLR, and supported by the German standards organization, DIN

Many thanks to JAXA, DLR, and DIN for providing the essential capability for CCSDS teams to make progress on the CCSDS missions.

For the most up-to-date meeting information, including hotel reservations and agendas, please visit the [website](#).

### 12<sup>th</sup> Ground System Architectures Workshop (GSAW) in California

GSAW2008 (31 March - 3 April 2008) is the 12th in a series of annual workshops that explore software and system architecture issues for spacecraft ground systems. This is the forum for the world's spacecraft ground system experts to share issues and solutions with other ground system users, developers, and researchers through presentations, working groups, and panel discussions.

GSAW2008 will highlight new ideas, lessons learned, and the identification of common solutions in the creation, application, and evaluation of architectures to meet the technological challenges of ground systems. GSAW's affiliation with government and civilian organizations provides an unparalleled opportunity to advance the state of practice and research in architectures for spacecraft ground systems. For more information, please visit the workshop website at <http://csse.usc.edu/gsaw/>.

### 14<sup>th</sup> Improving Space Operations Workshop in Maryland

Sponsored by the AIAA Space Operations and Support Technical Committee (SOSTC), this year's workshop will be held 15-16 April 2008 at the new NOAA Satellite Operations Facility in Suitland, MD, near Washington D.C.

As in past years, the emphasis will be on small groups working to advance the level of understanding in several technical areas relevant to space operations. Additionally, this year we will discuss Space Operations issues as they relate to public policy

decisions of the US and other national governments. More information can be found at [http://www.aiaa.org/tc/sos/ws2008/SOSTC\\_2008\\_workshop\\_flyer.pdf](http://www.aiaa.org/tc/sos/ws2008/SOSTC_2008_workshop_flyer.pdf)

### 10<sup>th</sup> SpaceOps Forum in Heidelberg in May

The tenth SpaceOps forum represents the most significant gathering of top space operators, scientists, and engineers, bringing together experts from around the world to discuss state-of-the-art operations principles, methods, and tools, in addition to the future direction of space operations. The conference will take place 12-16 May 2008 in Heidelberg, Germany at the Heidelberg Convention Centre.



Focusing on the theme of Protecting the Earth, Exploring the Universe, SpaceOps 2008 will address space operations in a variety of environments, both near and far. For more information, including a current meeting agenda, please visit the website at [www.spaceops2008.org](http://www.spaceops2008.org)

### Help Recognize Your Colleagues for Outstanding Work

The *AIAA Excellence in Aerospace Standardization Award* is presented on odd years to recognize contributions by individuals that advance the health of the aerospace community by enabling cooperation, competition, and growth through the standardization process.

Past winners of this award include:

- Dr. William W. Vaughan (2005)
- Dr. Macgregor S. Reid (2007)

Nominations for this award are accepted through the [AIAA website](#) and must be submitted by 1 July 2008.

### Help Spread the Word About CCSDS

In an effort to keep the widespread and continued use of CCSDS work in front of the greater space community, we have developed an organization communication plan. Part of this plan calls for issuing periodic press releases coinciding with significant missions, mission milestones, successes, demonstrations in which CCSDS specifications have played a role.

While we on the Secretariat staff can monitor the U.S.-based missions fairly well, we would very much appreciate your help in keeping us apprised of events worthy of further publicity occurring within your local space programs.

Of course an opportunity for publicity does not necessarily have to be directly mission-related. If you feel that ongoing standard development work may be of interest to a broader audience, let us know and we will help you to get the word out.

Please send any and all suggestions you may have at any time to [secretariat@mailman.ccsds.org](mailto:secretariat@mailman.ccsds.org).



# New and Noteworthy

*The following documents have recently been released for formal agency review or have been published.*

## Documents Under Review

### **CCSDS 401.0-P-18.1 (Pink Sheets): Radio Frequency and Modulation Systems--Part 1: Earth Stations and Spacecraft**

Recommendations contained in this document focus the standardization of RF and modulation systems for Earth stations and spacecraft. These Recommendations describe the capabilities, policies, and procedures that the CCSDS agencies believe will be needed in future years.

The current draft pink sheets update recommendations 2.2.3, 2.4.2, 2.4.17A, and 2.4.17B, and deletes references to CCSDS 412.0-G-1.

Comments due by 15 April 2008 and can be submitted via the following website: <http://public.ccsds.org/review/default.aspx>

## Recently Published Documents (since Oct. 2007)

### [XML Telemetric and Command Exchange \(XTCE\)](#)

The XTCE data specification provides an information model and data exchange format for telemetry and commanding definitions (operational database) in all phases of the a spacecraft, payload, and ground segment life cycle: system design, development, test, validation, and mission operations.

### [Tracking Data Message](#)

The Tracking Data Message (TDM) Recommended Standard specifies a standard message format for use in exchanging spacecraft tracking data between space agencies.

### [CCSDS Guide for Secure System Interconnection](#)

This Report is an adaptation of United States National Institute of Standards and Technology (NIST) Security Guide for Interconnecting Information Technology Systems (NIST Special Publication 800-47). The Report is tailored for the space community and provides a guide for secure space agency interconnections.

### [Overview of Space Communications Protocols](#)

This Report provides an architectural overview of the space link protocols recommended by CCSDS and shows how these protocols are used in space mission data systems.

### [Space Data Link Protocols—Summary of Concept and Rationale](#)

This Report contains background and explanatory material to support the CCSDS Recommended Standards on the TC, TM, and AOS Space Data Link Protocols and Communications Operation Procedure-1 that accompanies the TC Space Data Link Protocol.

### [Radio Frequency and Modulation Systems—Part 1: Earth Stations and Spacecraft](#)

These Recommendations are developed for conventional near-Earth and deep-space missions having moderate communications requirements.



The current mission count stands at [349](#)! Please help us to stay on top of this important statistic by informing the Secretariat any time a new program, mission, or vehicle you are working on decides to implement one of our specifications.

## CCSDS Leadership

**Mike Kearney** — CMC Chair and General Secretary

**Adrian Hooke** — CESG Co-Chair

**Nestor Peccia** — CESG Co-Chair

**Eduardo Bergamini** — ISO TC20/SC13 Chair

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