

CCSDS LINK

A QUARTERLY NEWSLETTER

VOLUME 2 ISSUE 3 — OCTOBER 2007

A Test for SM&C Standards

A new CNES project will be the first to implement SM&C standards.

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Fall 2007 Meeting Information



Find the latest information about the upcoming CCSDS meetings in Germany.

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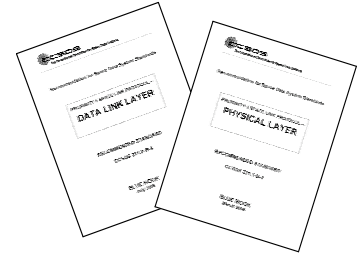
Meeting Schedule

Review the meeting schedule for the sessions in Heppenheim.

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New and noteworthy

Take a look at the CCSDS documents that have recently been published or released for formal review. [Page 7](#)



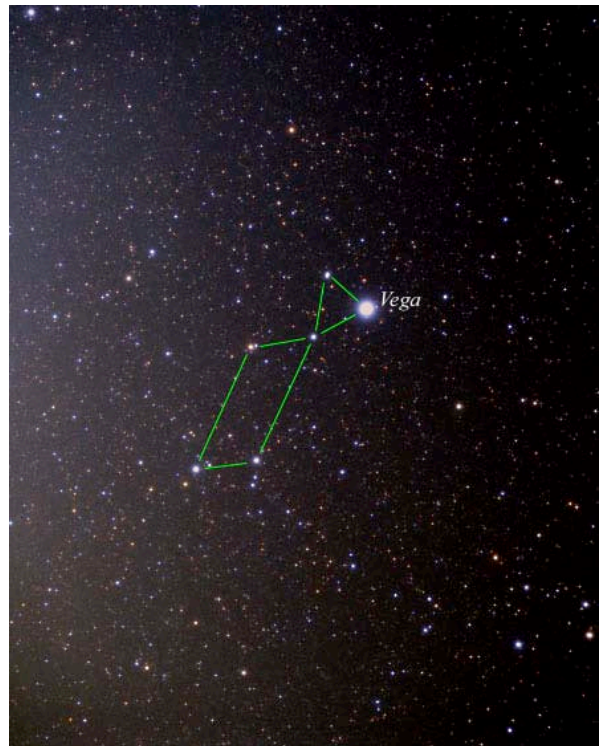
Welcome to the CCSDS Link

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 secretariat 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.

This issue of the *Link* is being released just as the Fall 2007 meetings are set to begin in Germany. Many details about the meeting locations and logistics can be found below. Also in this issue is a brief overview of the CMC meeting held in Brussels in June, an article on a new CNES project that will begin to implement CCSDS SM&C standards, and an update of some of the ongoing projects within the Secretariat office.

Did you know that 4 October will mark the 25th anniversary of the opening of the first official CCSDS meeting at CNES in Toulouse? October 1982 also marked the launch, by the Sony Corporation, of the first commercial compact disc system! Walt Disney World's EPCOT Center opened its doors to the public on October 1st, 1982. It was a historic month!

We are working on a number of initiatives to commemorate 25 years of CCSDS standardization work including a special logo and a reception in Darmstadt. If you have any stories or memories that you would like to share with the CCSDS community about the organization's history, please send them along to us and we'll include them in an upcoming issue of this newsletter.



Vega (~25 light years from Earth) is the brightest star in the constellation Lyra, the fifth brightest star in the sky and the second brightest star in the Northern celestial hemisphere, after Arcturus. It can often be seen near the zenith in the mid-northern latitudes during the evening in the Northern Hemisphere summer, and during these times from mid-southern latitudes it can be seen low above the northern horizon during the Southern Hemisphere winter.

June CMC Meeting Recap

The CMC held a successful interim meeting in June in Brussels. The main intent of the meeting was to review the outcomes from the IOAG meeting held the week before in Spain and determine if there were any actions needed from CCSDS to respond to IOAG decisions. The CMC members in attendance proposed, and subsequently approved by a poll, a number of resolutions and action items aimed at aligning CCSDS activities with the direction of IOAG.

There was also discussion regarding the NASA Coding, Modulation and Link Protocols study and how CCSDS would respond to the report. Cooperation with ISO TC20/SC14 and ECSS, new process automation tools, and future work with OMG were also topics for the meeting.

The full set of meeting minutes, with resolutions, action items, and attachments can be found on the [CMC portion of the CWE](#).

Secretariat Update

The CCSDS Secretariat staff has been busy working on a number of projects over the past few months. Of most interest to CCSDS participants will most likely be some of the business process automation tools that are being developed. With the implementation of the new CWE in February, we have been looking at ways to better utilize our website infrastructure to streamline a number of our processes.

The first project in this area is the creation of an online charter development and project proposal system. With the help of the CESG and CMC, requirements for a new system were documented and the development process has begun. The intent of the tool is to allow WG Chairs and Area Directors to better define their goals, objectives, and deliverables and to also provide the CMC with greater insight into the status of all of our ongoing projects. A first iteration of the new system was presented to the CMC members present at the meeting in Brussels. A number of comments and suggestions were received and the updates will be demonstrated during the joint CESG/CMC session in Darmstadt. We hope to be able to deploy the new system shortly following that meeting.

Following the release of the charter development tool, the next project to be undertaken will be an online RID submission and tracking system. Please do not hesitate to [contact the secretariat staff](#) if you have any suggestions for such a system or any other ways to increase the efficiency of CCSDS work.

CNES Nosyca - The First Candidate Project for SM&C Standards

CNES Open stratospheric balloons (BSO) classically carry payloads for scientific missions involved in environment measurement (aeronomy) or in astronomy.

They can also carry, at very low cost, payloads that will be used onboard satellites for testing in a "near-space" environment.

These balloons support missions between 1 to 3 days at altitudes between 20 and 45 km with payloads weighing between 50 and 2000 kg.

The CNES Nosyca project, due to start in 2009, is to renew the hardware and software responsible for monitoring and controlling these balloons. This new system must be multi-mission, support a project lifetime of many years, and be flexible enough to be able to support technology evolution.

To validate Nosyca specifications, a prototyping exercise using a real configuration on ground will be developed in November 2007. For this exercise CNES will be using their CCSDS Spacecraft Monitoring & Control (SM&C) adaptor developed for the demonstration at the 2007 Colorado Springs technical workshop. This adaptor allows the CNES Mission Control System (MCS) to "talk" SM&C.

The Nosyca prototype uses the CNES developed Java implementation of the SM&C Message Abstraction Layer (MAL). This implementation was completed in August and integrated with the MCS: the integration required no modification to the MCS code through the use of draft standard SM&C APIs. This is a further proof that the SM&C layering concept is providing immediate cost savings on development!

The low level SM&C MAL messages will be carried from ground to the balloon over UDP/IP using an IP router onboard and another router on ground.

During this prototyping exercise, to aid future development, the Java MAL implementation will also be used on the onboard balloon platform using an embedded Java Virtual Machine. This extension will provide feedback to the working group about issues and overheads arising from the layering in onboard to onboard communication and also onboard to ground communications.





Fall 2007 CCSDS Meetings

October meetings to be held in Heppenheim and Darmstadt Germany

The Fall 2007 meetings of CCSDS will be hosted by ESA the 1st through the 11th of October. The technical meetings will be held Monday, 1 October through Friday, 5 October in Heppenheim Germany with the management meetings taking place the following week in Darmstadt.

Detailed information about the meetings, the venues, and the cities is below to aid in planning your stay in Germany. For the most complete and up-to-date information, please consult the CCSDS website.

Week 1: 1-5 October 2007, Heppenheim Germany

The technical working group and plenary meetings will be held at the Hotel am Bruchsee. Located in the German state of Hesse, Heppenheim lies at the edge of the Odenwald mountains, approximately 45 km south of the Frankfurt airport. The meeting venue is situated in a quiet area overlooking a lake and features an on-site restaurant and bar. Wireless internet access will be available to meeting attendees throughout the week.



ESA is arranging lunch, but it comes with the hotel room, not the meeting. If you are staying outside the hotel, it will cost approximately 55 € for the week to eat lunch at the hotel. This must be paid when you pick up your registration materials. In order to ensure there is sufficient food for all attendees, if you have not booked a room at the Bruchsee hotel but plan to have lunch there during the week, please inform [Angelika Slade](#).

The [schedule below](#) represents the most up-to-date meeting listing as of 27 September. Any last minute changes to the schedule will be announced during the opening plenary session.

About Heppenheim

Nestled at the foot of the Oldenwald Mountains is the historic town of Heppenheim, a city of nearly 25000 people. Heppenheim is located in southern Germany between Frankfurt and Mannheim.

Records from early history confirm that Heppenheim was settled some 2000 years before Christ. History can be found down the narrow, twisty streets of the old town with their picturesque half-timbered houses. Many a witness to the past is still standing, from the Kurmainzer Amtshof with its wine cellar and mu-

seums to the marketplace with the town hall and chiming bells. In 1065, Abbot Udalrich built the "strong castle" which still stands today. It is said that Udalrich fled to the fortress with his monks and treasures of the monastery. It can be seen from many points offering an extensive view. The castle was rebuilt in 1960 and now serves as a youth hostel.

The cultivation of wine is as old as the town itself, first mentioned in the Lorsch Codex in 755AD. The Bergstrabe Wine Market is Heppenheim's largest public festival drawing nearly 100,000 visitors each year.

The mountain route around Heppenheim is well known as the spring garden. Here spring awakens before it distributes its blooms over the rest of Germany. The landscape is protected by the Odenwald Mountains and offers the grape vines ideal growing conditions. Almond, peach, apricot and cherry trees unfold the beauty of their splendor.



The average yearly climate is 10°C, with an annual precipitation of approximately 72 cm making it conducive to a long vegetation season. The change from mountain to valley offers a diverse wine-fruit landscape and a natural habitat for warm-loving animals and plants. (taken from <http://www.ci.west-bend.wi.us/Sister%20Cities/Germany/germany.htm>)

As a bit of logistical info, the GPS coordinates for the Hotel Am Bruchsee in Heppenheim in case anyone cares to navigate from Frankfurt to the hotel via GPS is as follows (from <http://www.gpsvisualizer.com/>):

<i>Result precision</i>	address
<i>Address</i>	Am Bruchsee 1
<i>City</i>	64646 Heppenheim (Bergstrasse)
<i>State/Region</i>	Germany
<i>Country</i>	DE [Germany]
<i>Latitude</i>	49.62973
<i>Longitude</i>	8.627403
<i>Coordinates</i>	49.629730, 8.627403
	N49°37.7838, E008°37.64418

25th Anniversary Reception

To commemorate the 25th anniversary of the first official CCSDS meeting, our ESA hosts have organized a reception at the "Grillhuette Am Woog" in Darmstadt on 4 October 2007. The festivities will begin at 18:00 with argentinian beef, german sausages, a lot of beer and wine, plus some surprises.

There will be a small fee of 5 € for each participant to help with the costs of the event. Bus transportation to and from Darmstadt will be provided for the evening. More details about the event will be provided to attendees during the meeting.

1st XTCE Users Workshop

The XML Telemetric and Command Exchange (XTCE) is an XML-based standard format aiming at facilitating the exchange of spacecraft telemetry and command databases between different organizations and systems during any mission phase. Such a non-proprietary format avoids the need for customized import/export tools and the validation and new implementation of mission databases, which are often error-prone.

XTCE can be used to exchange telemetry and command databases among the instrument manufacturers, the spacecraft prime contractor and the operational teams and to disseminate them to the different systems in the ground segment.

XTCE has been developed by the Object Management Group (OMG) and is in the process of being adopted as a CCSDS standard after 2 CCSDS Agency reviews.

On 2 October 2007, during the CCSDS meetings in Heppenheim Germany, the 1st XTCE Users Workshop will take place in the Darmstadt area under the sponsorship of the CCSDS Spacecraft Monitoring & Control working group. The workshop will be an opportunity for current and intended users of XTCE to get together, share their experiences and talk about ways to improve the interoperability of XTCE. In addition, there will be a chance to share implementation information, discuss desired features and document any issues that need to be addressed in possible future revisions of the standard.

Despite being quite young, XTCE is being proposed for use by several NASA missions, including the Constellation manned flight program and by several US military space missions. Also in the US, Harris corporation has implemented an XTCE "ingestor" as part of their product package. In Europe, ESA, CNES, DLR and various industrial partners (e.g. Terma, EADS) also plan to support its use. As such, the time seems ripe to get together, compare initial notes and make sure that XTCE will be a successful standard.

Week 2: 8-11 October 2007, Darmstadt Germany

The CESG, CMC, and ISO TC20/SC13 meetings will be held the week following the technical meetings at ESA's ESOC facility in Darmstadt, Germany.

The European Space Operations Center (ESOC) is the center of ESA's space operations. Since its creation in 1967, ESOC has planned missions, operated more than 50 satellites and ensured that spacecraft meet their mission objectives. The mandate of ESOC is to conduct mission operations for ESA satellites and to establish, operate and maintain the necessary ground segment infrastructure.

Please remember your photo ID, you will need it to gain entry to the ESOC facility. A list of participants will be left at the main gate.

The schedule for the second week of meetings is as follows:

Monday 8 October: CESG Work Day - 08:30 - 17:30

Monday 8 October: ISO TC20/SC13 Meeting - 13:00 - 15:00

Tuesday 9 October: Joint CESG/CMC Meeting - 09:00 - 17:00

Wednesday 10 October: CMC Meeting - 09:00 - 17:00

About Darmstadt

Surrounded by the recreational areas of the Odenwald and the Bergstrasse, the Taunus and the Spessart, Darmstadt is favored not only by nature, having a mild climate and fertile countryside, but is also particularly conveniently located for travel, being in the center of Germany between the industrial regions of Rhine-Main and Mannheim-Ludwigshaven and close to the financial center Frankfurt. Frankfurt has the largest airport in Germany which is only a 25 minutes ride by a shuttle bus going non-stop to the city of Darmstadt.



Darmstadt is a city full of cultural life, with many museums, galleries and expositions and an old theatrical tradition. Many old buildings, parks and gardens give evidence of the various epochs of history.

GPS coordinates for the meeting venue at ESOC are below:

Result precision	address
Address	Robert-Bosch-Strasse 5
City	64293 Darmstadt
State/Region	Germany
Country	DE [Germany]
Latitude	49.870769
Longitude	8.623286
Coordinates	49.870769, 8.623286
	N49°52.24614, E008°37.39716

For Your Information

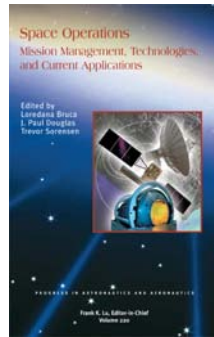
10th SpaceOps Forum in Heidelberg in 2008

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. Submit your abstracts before the deadline, 1 October 2007. For more information about the conference, please visit the website at www.spaceops2008.org

Recently Published Space Operations Book

AIAA recently published *Space Operations: Mission Management, Technologies, and Current Applications*. The book brings together a number of papers from the 2006 SpaceOps meeting. From the publisher:



“A total of 280 papers were presented and discussed in 76 subject-oriented sessions during the eighth biennial SpaceOps Symposium in June 2006. The Symposium was hosted by the Italian Space Agency (ASI) in Rome, with high international participation. The SpaceOps Executive Committee and AIAA decided to publish a selection of papers representing the major fields of interest to today’s world space-operations community. This volume, *Space Operations: Mission Management, Technologies, and Current Applications*, is the result of that decision.

The selection of 36 reviewed and updated papers published in this book was driven by their quality and relevance to the space operations community. The selected papers represent a cross section of three main subject areas:

Spacecraft Operations covers the preparation and implementation of all activities to operate a space vehicle (manned and unmanned) under normal, non-nominal, and emergency conditions.

Ground Operations covers the preparation, qualification, and operations of a mission-dedicated ground segment and appropriate infrastructure including antennas, control centers, and communication means and interfaces.

Management covers all management tasks for preparing and operating a particular mission.”

A full table of contents (which includes a number of CCSDS-related papers) and editor information can be found on the [AIAA website](http://www.aiaa.org).

CCSDS Fall 2007 WG Meeting Schedule (as of 27 September 2007)

WEEK ONE

- Starkenburg room
- Maiberg room
- Schlossberg room
- Hemsberg room
- Rulaender room
- Centgericht room
- Steinkopf room
- Eckweg room
- Rooms 212 / 214
- Room 215
- Room 216
- Fitness room
- Hotel Restaurant

- Sta
- Mai
- Sch
- Hem
- Rul
- Cen
- Ste
- Eck
- 212
- 215
- 216
- Gym
- Res

	Oct 1st - Mon - 08:00 - 09:00	Oct 1st - Mon - 09:00 - 12:00	Oct 1st - Mon - 13:00 - 17:00	Oct 2nd - Tue - 08:00 - 12:00	Oct 2nd - Tue - 13:00 - 17:00	Oct 3rd - Wed - 08:00 - 12:00	Oct 3rd - Wed - 13:00 - 17:00	Oct 4th - Thu - 08:00 - 12:00	Oct 4th - Thu - 13:00 - 17:00	Oct 5th - Fri - 08:00 - 12:00	Oct 5th - Fri - 13:00 - 17:00	Oct 5th - Fri - 17:00 - 18:30
CCSDS												
Registration												
0.0 CCSDS Plenary	125											
Systems Engineering Area												
1.0 SEA Plenary		Rul									Hem	
1.1 System Architecture WG			Rul									
1.2 Security WG						Hem	Hem	Hem	Hem	Hem		
1.3 Info Arch WG				216								
1.4 SANA WG						215	215					
1.x XML Stds & Guidelines SIG + IPR Meeting										216		
1.xx Delta-DOR SIG				215	215							
1.xxx Timecode BoF			216									
Mission Ops and Info Mgt Svcs Area												
2.0 MOIMS Plenary	Sta											Sta
2.1 Data Archive Ingestion WG	Ste	Ste	Ste	216	Gym	212	Gym	Res	Res	Cen		
2.2 Navigation WG	Eck	Eck	Eck	Eck	Eck	Eck	Eck	Eck	Eck	Eck		
SEA IA + IPR Meeting				Ste								
2.3 Info Packing and Registries WG						Gym			216			
2.4 Spacecraft Monitor & Ctrl WG	Sta	Sta	Gym	Gym	Sta	Sta	Sta	Sta	Sta	Sta		
Cross Support Services Area												
3.0 CSS Plenary	Mai											Mai
3.3 Service Management			Mai	Mai	Mai	Mai	Mai	Mai	Mai	Mai		
3.6 Cross Supt Transver Svcs WG			Cen	Cen	Cen	Cen	Cen	Cen	Cen	Cen		
3.x Cross Supt Architecture BOF							Mai					
Spacecraft Onboard I/F Svcs Area												
4.0 SOIS Plenary	Gym	Gym								Rul	Rul	
4.1 Subnetwork WG												
4.3 Application Support Services WG						212		216				
4.x Wireless BoF								Ste	Ste	Res		
4.xx Plug-and-Play BoF				Rul	Rul				215			
Space Link Services Area												
5.0 SLS Plenary												Ste
5.1 RFM/RNG WG		Sch	Sch	Sch	Sch			Sch	Sch	212	Eck	
5.2 Space Link Code/Sync WG						Sch	Sch	Rul	Rul	Ste		
5.4 Space Link Protocols WG		Hem	Hem							Gym		
5.6 Ranging WG												
5.8 High Rate Uplink WG				Hem	Hem							
5.9 Multispectral & Hyperspectral Data Compression WG			212	212	212	Ste	Ste	212	212	215		
Space Networking Services Area												
6.0 SIS Plenary										Sch	Sch	
6.5 Async Messaging Service WG								215				
6.6 IP over CCSDS links WG						Rul						
6.7 Mars Communication Profile WG							Rul					
6.x Voice BOF						216						
6.xx Motion and Imagery Applications BOF							216					
6.xxx DTN BOF									Gym			
Joint Meetings												
Joint SIS-AMS and MOIMS-SMC						Sta						
Joint SIS-AMS and SOIS-ASS							Res					
Joint CSS-SM and MOIMS-SMC				Mai								
Workshops												
1st XTCE Users Workshop				Sta	Sta							
CESG Wrap Up Session (CESG Members Only)												Sta

New and Noteworthy

The following documents have recently been published.

[Spacecraft Onboard Interface Services](#)

This Informational Report describes the concept and supporting rationale for the Spacecraft Onboard Interface Services (SOIS). It is intended to provide an introduction and overview of the SOIS services concept upon which the detailed CCSDS SOIS recommendations are based, as well as to summarize the specific individual service recommendations and rationale. The concepts described in this Informational Report are the baseline concepts for the CCSDS standardization activities with respect to services and generic support services to be used in the flight segment of spacecraft systems.

[Image Data Compression](#)

This Informational Report presents a summary of the key operational concepts and rationale which underlie the requirements for the CCSDS Recommended Standard, Image Data Compression (CCSDS 122.0-B-1). Supporting performance information along with illustrations are also included. This report provides a broad tutorial overview of the CCSDS Image Data Compression algorithm and is aimed at helping first-time readers to understand the Recommended Standard.



The current mission count stands at [347!](#) 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 — “Acting” CMC Chair and General Secretary
Adrian Hooke — CEGS Chair
Eduardo Bergamini — ISO TC20/SC13 Chair

Secretariat Staff

Tom Gannett — Documentation Support
Brian Oliver — Web Design and Engineering Support
Craig Day — Process Support