CCSDS Engineering Steering Group (CESG):
Operating Report

Joint CMC-IAOG Meeting

07 December 2004

CNES, Toulouse, France

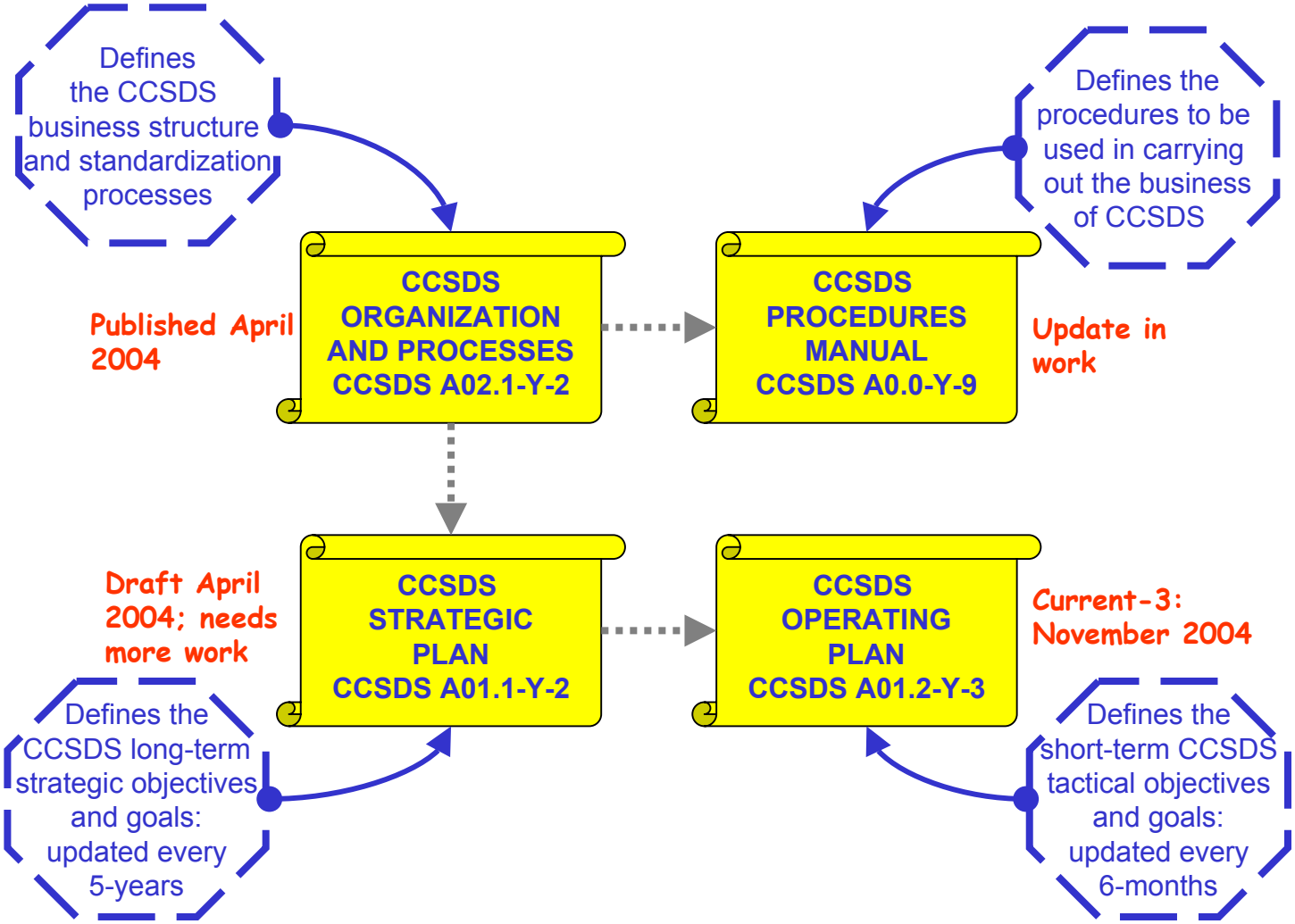
Adrian J. Hooke

Chairman, CESG

CESG Operating Report

1. Overview of CESG Operations
2. Technical Status: Fall 2004
3. Reports from the Area Directors
4. Special topics:
   - Cross Support Services
   - Telemetry Channel Coding

CCSDS Operations



CCSDS Strategic Plan

Strategic Plan
of the
Consultative Committee
for Space Data Systems

CCSDS A01.1-Y-2

April 2004

Draft 3

Contents

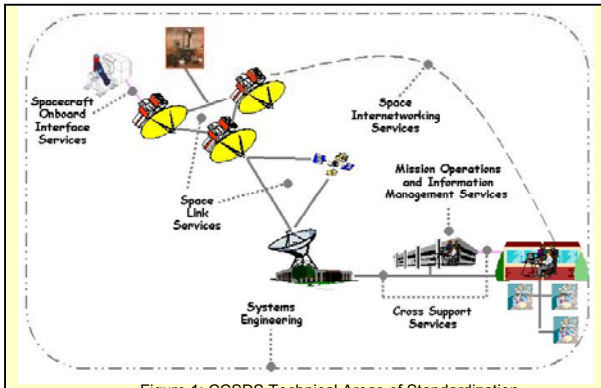


Figure 1: CCSDS Technical Areas of Standardization

CCSDS Area Objectives and Goals

1. SYSTEMS ENGINEERING AREA

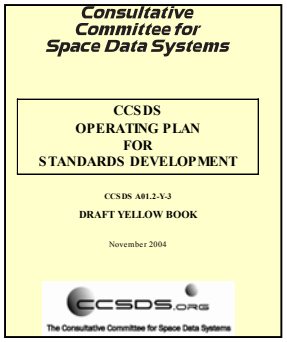
The objective of the Systems Engineering Area (SEA) is to address system-wide architectural and engineering aspects that are so pervasive that they span both the Informatics and Telematics Domains.

The strategic goals of the SE Area are:

a. By 2005: to define an overall architecture and representational methodology for space mission communications, operations, and cross-support.
b. By 2006: to define a reference information architecture, information infrastructure services and interfaces, and frameworks for handling operational data flows and supporting multi-agency federated data systems.
c. By 2006: to define an updated Space Assigned Numbers Authority (SANA), using Information Architecture elements, to enable both a centralized reference point and distributed federated elements own by participating agencies.
d. By 2007: to define a security architecture, and to define framework, infrastructure mechanisms and techniques to protect system elements and information as it flows through the end-to-end space mission system.
e. By 2008: to define an overall time services architecture for time correlation, synchronization, and distribution, for end-to-end mission operations operations and cross-support throughout the mission lifecycle.

- CCSDS Agency reviews are not yet complete
- ***We welcome an IOAG input***
- Major revision in Spring 2005
- Approve at April 2005 meeting

CCSDS Operating Plan



CCSDS OPERATING PLAN CCSDS A01.2-Y-(N-1)

CCSDS OPERATING PLAN CCSDS A01.2-Y-(N)

CCSDS OPERATING PLAN CCSDS A01.2-Y-(N+1)

Meeting — Meeting — Meeting — Meeting

N-1 | N | N+1

Contains the current charter and working plan for every approved CCSDS Working Group:

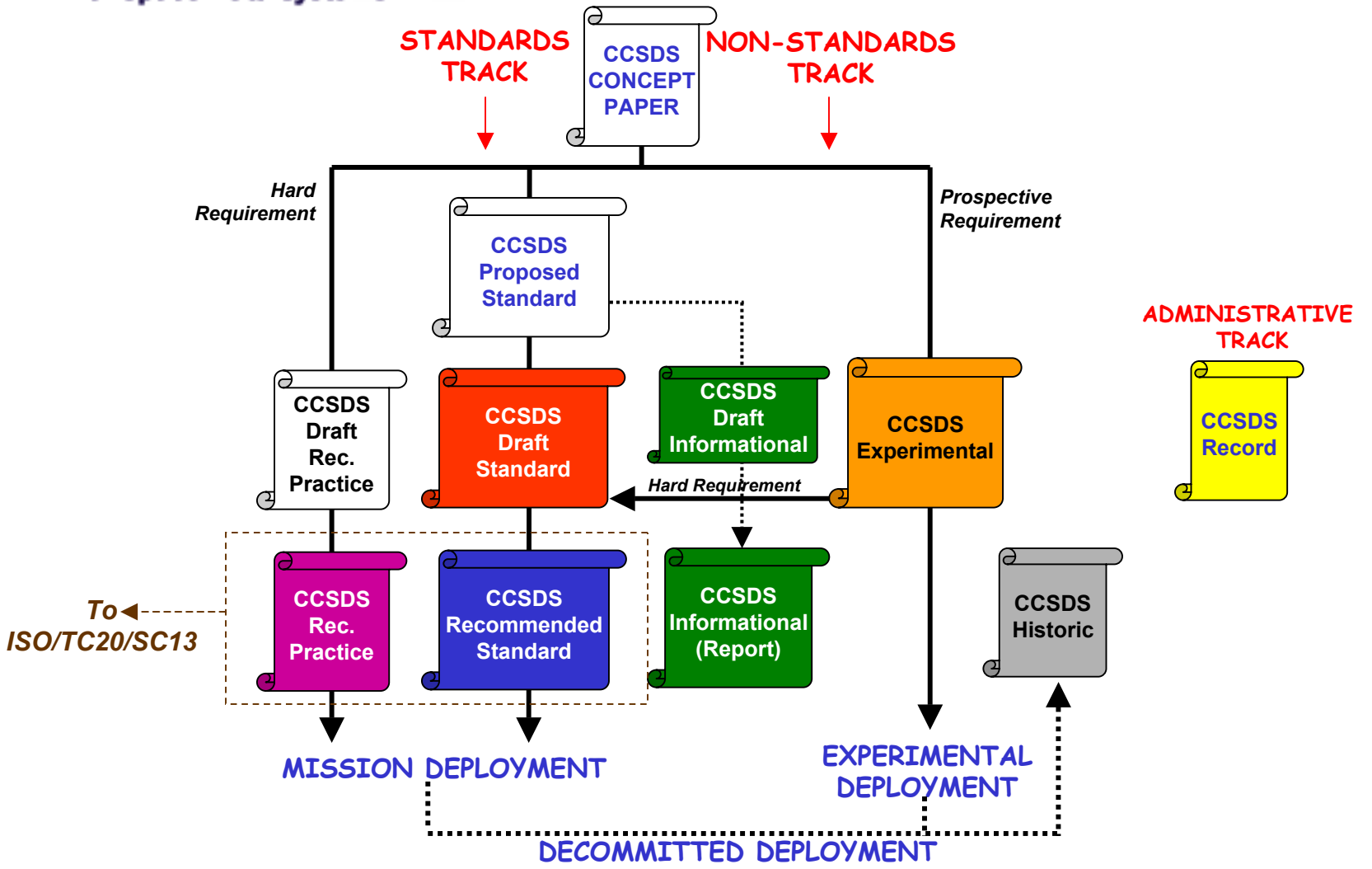
- GOALS
- SCHEDULE AND DELIVERABLES
- RISK MANAGEMENT STRATEGY
  - Technical Risks
  - Management Risks
- RESOURCE REQUIREMENTS

CMC MEETING CMC confirms resource commitment for work period N

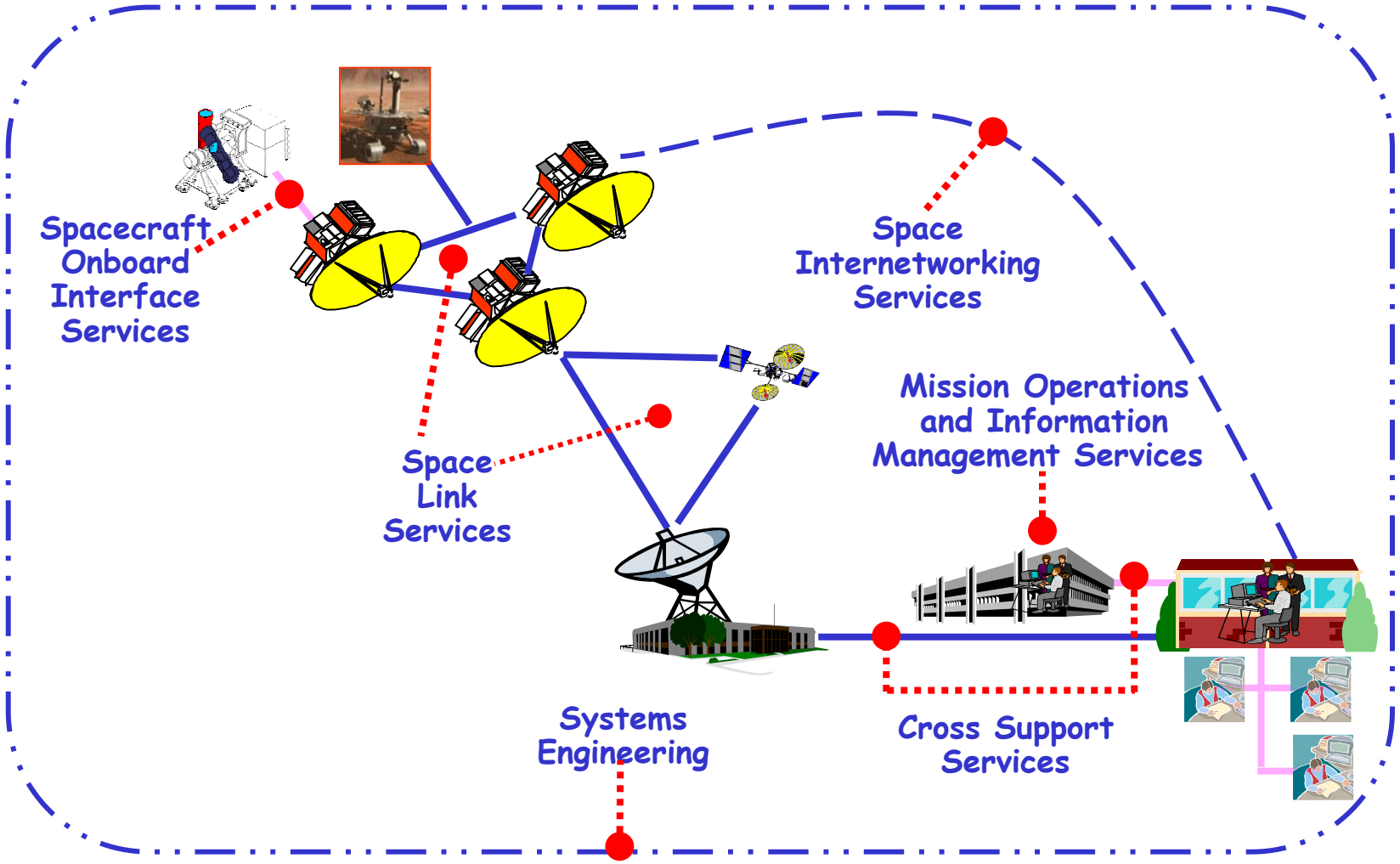
CMC MEETING: CMC confirms resource commitment for work period N+1

~ 6 months work period "N"

CCSDS Tracks



CESG Technical Areas



Fall 2004: CESG Working Groups

CCSDS Working Structure going into Fall 2004 meeting

SYSTEMS ENGINEERING AREA (SEA)	1.1 Systems Architecture WG 1.2 Security WG 1.3 Information Architecture WG 1.4 SANA BOF
MISSION OPERATIONS AND INFORMATION MANAGEMENT SERVICES (MOIMS) AREA	2.1 Data Archive Ingestion WG 2.2 Navigation WG 2.3 Info. Pack. & Registries WG 2.4 S/C Mon + Control WG
CROSS SUPPORT SERVICES (CSS) AREA	3.1 SLE Ref. Model WG 3.2 SLE Data Trans. Svcs WG 3.3 SLE Service Mgmt. WG 3.4 SLE Nav. Svcs BOF 3.5 SLE RAD BOF
SPACECRAFT ONBOARD INTERFACE SERVICES (SOIS) AREA	4.1 Onboard Bus + LAN WG 4.2 Time Crit O/B Net Svc WG 4.3 Time Crit O/B Apps. WG 4.4 Onboard plug-play BOF 4.5 Onboard Transducer BOF 4.6 Wireless BOF
SPACE LINK SERVICES (SLS) AREA	5.1 RF & Modulation WG 5.2 Space Link Code/Sync. WG 5.3 Data Comp. WG 5.4 Space Link Protocols WG 5.5 TC Channel Coding WG 5.6 Ranging Working Group 5.7 Prox-1 Build-2 WG 5.8 Long Eras. Codes BOF
SPACE INTERNETWORKING SERVICES (SIS) AREA	6.1 CFDP Interop. Testing WG 6.2 Unack. CFDP Extensions WG 6.3 Packet Protocol WG 6.4 Cislunar WG 6.5 DTN BOF

- *24 chartered Working Groups*
- *8 Birds-Of-a-Feather (BOF) groups*

Fall 2004: CESG Key Personnel

POSITION	CHAIR	DEPUTY
CESG Chair	A. Hooke/NASA	N. Peccia/ESA
SE Area Director	P. Shames/NASA	T. Yamada/JAXA
1.1 Systems Architecture WG	T.Yamada/JAXA	E. Soerensen/ESA
1.2 Security WG	H. Weiss/NASA	G. Kenney/BNSC
1.3 Information Architecture WG	D. Crichton/NASA	
1.4 SANA BOF	P. Shames/NASA	
MOIMS Area Director	N. Peccia/ESA	R. Thompson/BNSC
2.1 Data Archive Ingestion WG	D. Sawyer/NASA	C. Huc/CNES
2.2 Navigation WG	F. Flores/NASA	M. Pallaschke
2.3 Info. Pack. & Registries WG	L. Reich/NASA	S. Hughes/NASA
2.4 S/C Mon + Control WG	M. Merri/ESA	R. Thompson/BNSC
CSS Area Director	vacant	G. Lapaian/CNES
3.1 SLE Ref. Model WG	H. Kelliher/BNSC	
3.2 SLE Data Trans. Svcs WG	Y. Doat/CNES	
3.3 SLE Service Mgmt. WG	vacant	E. Barkley/NASA
3.4 SLE Radio Metric BOF		
3.5 SLE "Super Service" BOF		
SOIS Area Director	P. Plancke/ESA	C. Plummer/ESA
4.1 Onboard Bus + LAN WG	R. Schnurr/NASA	C. Plummer/ESA
4.2 Time Crit O/B Net Svc WG	S. Parkes/BNSC	J. Marquart/NASA
4.3 Time Crit O/B Apps. WG	A. Sengupta/NASA	S. Fowell/BNSC
4.4 Onboard plug-play BOF	P. David/ESA	
4.5 Onboard Transducer BOF	C. Plummer/ESA	
4.6 Wireless BOF	P. Plancke/ESA	A. Sengupta/NASA
SLS Area Director	J-L. Gerner/ESA	G. Moury/CNES
5.1 RF & Modulation WG	E. Vassallo/ESA	
5.2 Space Link Code/Sync. WG	G-P. Calzolari/ESA	
5.3 Data Comp. WG	P-S. Yeh/NASA	
5.4 Space Link Protocols WG	G. Kazz/NASA	
5.5 TC Channel Coding WG	G-P. Calzolari/ESA	
5.6 Ranging Working Group	E. Vassallo/ESA	
5.7 Prox-1 Build-2 WG	G. Kazz/NASA	
5.8 Long Eras. Codes BOF	G-P. Calzolari/ESA	
SIS Area Director	R. Durst/NASA	D. Stanton/BNSC
6.1 CFDP Interop. Testing WG	R. Carper/NASA	M. Ciccone/ESA
6.2 Unack. CFDP Extensions WG	S. Burleigh/NASA	
6.3 Packet Protocol WG	D. Stanton/ BNSC	
6.4 Cislunar WG	K. Scott/NASA	
6.5 DTN BOF	S. Burleigh/NASA	

CCSDS WG/BoF Chairs: Fall 2004

Fall 2004: Agency Resource Allocations

~20.0 staff years committed

- ASI: 0.20
- BNSC: 1.88
- CNES: 3.16
- DLR: 0.55
- ESA: 4.86
- INPE: 0.20
- JAXA: 1.03
- NASA: 8.05

	ASI		BNSC		CNES		CSA		DLR		ESA		INPE		JAXA		NASA		RSA	
CESG Chair																	Hooke	0.5		
CESG Deputy Chair											Peccia									
SE Area Director															Shames			0.2		
SE Deputy Area Director															Yamada					
1.1 Systems Architecture WG					Jocteur	0.2				0.00	Lindman	0.1	Bergamini	0.1	Yamada	0.2	Shames	0.25		0
																	Ray	0.1		
1.2 Security WG	Chinetti	0.05	Kenney	0.33	Blaignan/	0.05	Hartman	0.1	Pilgram	0.05		0	Bergamini	0		0	Weiss	0.25		0
	Chessa	0.05			Pechmalbec/												Sigman	0.25		
					Belbis												Childs	0		
1.3 Information Architecture WG		0	Giaretta	0	Jocteur	0.05		0				0	Bergamini	0.1		0	Crichton	0.25		0
																	Mattmann			
MOIMS Area Director											Peccia									
MOIMS Deputy Area Director			Thompson																	
2.1 Data Archive Ingestion WG		0	Giaretta	0.15	Huc	0.2		0			Pinna	0.05	Thomaz	0		0	Sawyer	0.15		0
											Mbaye	0.15								
											Francois	0.15								
											tbd	0.1								
2.2 Navigation WG		0		0	Foliard	0.1		0	Kiehling	0.10	Santos	0.3	Bertachini	0	Ogawa	0.1	Berry	0.25		0
					Delattre	0.045									Sawabe	0	Martin-Mur	0		
																	Flores	0		
2.3 Info. Pack. & Registries WG		0	Giaretta	0.15	Mazal/	0.4		0			Palliashcke	0.08	Thomaz	0		0	Hughes	0.1		0
					Lucas/						Mbaye	0.15					Sawyer	0.15		
					Mingulllon						Francois	0.15					Reich	0		
2.4 S/C Mon + Control WG		0	Thompson	0.15	Poupart	0.1		0	Hofmann	0.10	Merri	0.1	Milani	0	Yamada	0.1	Oyake	0.1		0
+ XTCE Finalization (FTF)			Symonds	0.17	Behal	0.15					Schmidt	0.1					Lokerson	0.3		
					Cornier	0.1					Dankiewicz	0.3								
											Cooper	0.3								
CSS Area Director																	Brosi	0.1		
CSS Deputy Area Director					Lapaian	0.1														
3.1 SLE Ref. Model WG		0	Kelliher	0.2		0		0				0		0	Iwana	0.025		0		0
3.2 SLE Data Trans. Svcs WG	Togni	0.1		0		0		0	Pilgram	0.10	Doat	0.1		0	Iwana	0.025		0		0
											Goetzelmann	0.3								
3.3 SLE Service Mgmt. WG		0	Kelliher	0.15	de Beaumont	0.05		0	Ohmuller	0.10	Theis	0.1		0	Iwana	0.025	Barkley	0.2		0
					Jocteur	0.05					Hernandez	0.1					Pietras	0		
3.4 SLE Nav. Svcs BOF		0		0		0		0				0	Bertachini	0	Iwana	0.025	Berry	0.1		0
3.5 SLE RAD BOF		0		0		0		0				0		0	Iwana	0.025	Greenberg	0		0
																	Israel	0.1		
SOIS Area Director											Plancke									
SOIS Deputy Area Director											Plummer									
4.1 Onboard Bus + LAN WG		0	Parkes	0.05		0		0			Kiefer	0.05		0	Anegawa	0.025	Schnurr	0.05		0
											Furano	0.1					Marquart	0.05		
4.2 Time Crit OIB Net Svc WG		0	Parkes Mills	0.15		0		0			Ciccone	0.4		0	Anegawa	0.025	Sengupta	0.1		0
				0.15													Schnurr	0.05		
																	Marquart	0.05		
4.3 Time Crit OIB Apps. WG		0	Fowell	0.15		0		0			Kiefer	0.05		0	Anegawa	0.025	Sengupta	0.1		0
																	Vaughs	0.2		
																	Marquart	0.05		
																	Schnurr	0.05		
4.4 Onboard plug-play BOF		0	Fowell	0.05		0		0			David	0.1	Milani	0	Anegawa	0.025	Oyake	0.1		0
4.5 Onboard Transducer BOF		0		0		0		0				0	Milani	0		0		0.1		0
SLS Area Director											Gerner									
SLS Deputy Area Director					Moury	0.1														
5.1 RF & Modulation WG		0		0	Lesthievant	0.05		0	Haeusler	0.10	Vassallo	0.1	Grivet, Reis	0	Yajima	0.1	Lee	0.2		0
											Boscagli	0.05	Mollica				Fong	0.1		
5.2 Space Link Code/Sync. WG		0		0	Lesthievant	0.07		0			Calzolari	0.05	Pallazo	0		0	Pollara	0.1		0
					Rocher	0.2					Chiani	0.16					Fong	0.1		
											Dardari	0.16								
5.3 Data Comp. WG		0		0	Moury	0.15		0				0		0		0	Kiely	0		0
																	Yeh	0.3		
5.4 Space Link Protocols WG		0	Cosby	0.2	Rocher	0.2		0				0		0	Yamada	0.1	Kazz	0.1		0
																	Greenberg	0.1		
																	Ray	0.1		
5.5 TC Channel Coding WG		0		0	Lesthievant	0.015		0			Calzolari	0		0		0	Pollara	0.1		0
					Rocher	0.2											Fong	0.1		
5.6 Ranging Working Group		0		0	Lesthievant	0.03		0			Vassallo	0.1	Grivet	0		0	Greenberg	0.1		0
											tbd	0.5	Bertachini				Marr	0.1		
5.7 Prox-1 Build-2 WG		0	Cosby	0.2		0		0				0		0		0	Kazz	0.1		0
																	Ray	0.1		
5.8 Long Eras. Codes BOF		0		0	Lesthievant			0			Calzolari	0.05	Palazzo	0		0	Pollara	0.1		0
											Chiaraluce	0.16								
SIS Area Director																				
SIS Deputy Area Director			Stanton														Durst	0.1		
6.1 CFDP Interop. Testing WG		0		0	Rocher	0.05		0			Ciccone	0.2		0	Taromaru	0.05	Carper	0.2		0
					Lasserre	0.1											Rundstrom	0.1		
																	Ray	0.2		
6.2 Unack. CFDP Extensions WG		0		0	Vincent-	0.1		0				0		0	Taromaru	0.05	Burleigh	0.1		0
					Franck												Ray	0.2		
6.3 Packet Protocol WG		0	Stanton	0.05	Rumeau	0.2		0				0		0	Yamada	0.1	Kazz	0.1		0
					Soy	0.1														
6.4 Cislunar WG		0		0		0		0				0		0		0	Scott	0.2		0
																	Israel	0.5		
																	Whitaker	0.2		
6.5 DTN BOF		0	Stanton	0.2		0		0				0		0		0	Burleigh	0.1		0
Totals		0.20		1.88		3.16				0.55		4.86		0.20		1.03		8.05		0.00

Summary CESG Status, Fall 2004

AREA	STATUS
SE AREA	
1.1 Systems Architecture WG	XASTRO IP issue; impact of RASDS on other areas
1.2 Security WG	Good progress; current focus on *interoperability* needs
1.3 Information Architecture WG	On schedule; strong MOIMS concerns that staff isn't diverse.
1.4 SANA BOF	WG charter drafted
MOIMS AREA	
2.1 Data Archive Ingestion WG	Work again progressing following PAIMAS approval
2.2 Navigation WG	CCSDS 502.0, Orbit Data Messages approved as Blue Book
2.3 Info. Pack. & Registries WG	No problems
2.4 S/C Mon + Control WG	Good progress but XCTE review stalled; OMG overlap?
CSS AREA	Loss of Area Director (Brosi)
3.1 SLE Ref. Model WG	Anticipate Blue/Green books in Spring 2005
3.2 SLE Data Trans. Svcs WG	Five Blue Books ready: RAF,CLTU,ROCF,FSP and RCF
3.3 SLE Service Mgmt. WG	Lost two key personnel (Pietras; Quintela). Red Book stalled
3.4 SLE Radio Metric BOF	Retired and rolled into proposed "Generic Services" WG
3.5 SLE "Super Service" BOF	Drafted charter for proposed "Generic Services" WG
SOIS AREA	
4.1 Onboard Bus + LAN WG	6-month slip – key people unavailable
4.2 Time Crit O/B Net Svc WG	Red Book in preparation but 4-month resource slip
4.3 Time Crit O/B Apps. WG	4-month slip due to critical personnel hiatus (Fowell, Plummer)
4.4 Onboard plug-play BOF	Slow progress: will probably merge into TCOAS-WG
4.5 Onboard Transducer BOF	Little progress – key people unavailable
4.6 Wireless BOF	Promising start
SLS AREA	
5.1 RF & Modulation WG	Excellent progress
5.2 Space Link Code/Sync. WG	LDPC code issue restarted in "LDPC - New Codes BOF"
5.3 Data Comp. WG	Red Book in review, Green Book and Ref S/W in work
5.4 Space Link Protocols WG	Good progress
5.5 TC Channel Coding WG	WG restarted with ESA resources & NASA contribution
5.6 Ranging Working Group	Good progress
5.7 Prox-1 Build-2 WG	Pink Sheets drafted
5.8 Long Eras. Codes BOF	Slow progress but NASA-JPL now back onboard
5.9 LDPC - New Codes BOF	Req'mts. & Evaluation Criteria by 4/05: then code proposals
SIS AREA	
6.1 CFDP Interop. Testing WG	Slow progress. Expect Pink Sheets by 5/05.
6.2 Unack. CFDP Extensions WG	Revised Draft Standard out for Agency review and approval
6.3 Packet Protocol WG	ISO DIS 22646 in review. Green Book ready for approval
6.4 Cislunar WG	Draft Green Book. No CMC feedback on WG chartering.
6.5 DTN BOF	Initial meeting. Good agreement on Async. Messaging Svce.

Onboard Interfaces: slow progress

SOIS 2005 Planning Milestones

Working Group	Action/Document	Due Date (2005)	Responsible	Reviewers (Area level)
TCOAS	SOIS Green Book	End March	Abhihjit	All Sois
TCOAS-CDA	Capability Set 1 Draft red	Mid-March	Chris	TCOAS
TCOAS-MTS	Draft MTS Red book	Fall 2005	Stuart-Ashton	All Sois
TCONS	Draft Green Book / All Services	End June	Jane	All Sois
TCONS	Draft Red Book BE + G services	End September	Steve, Jane	All Sois
TCONS	Draft Red Book Scheduled services	End December	Steve, Jane	All Sois
BusLan	Draft Red Book	End October	Rick	All Sois
BOF Plug/Play	Final Recommendations TN	mid March	Phillipe David	All Sois
BOF Transducer	Position paper	End March	Chris, Amalaye,G L Furano	All Sois
BOF Wireless	Position paper	End March	John, Inma, Patrick	All Sois

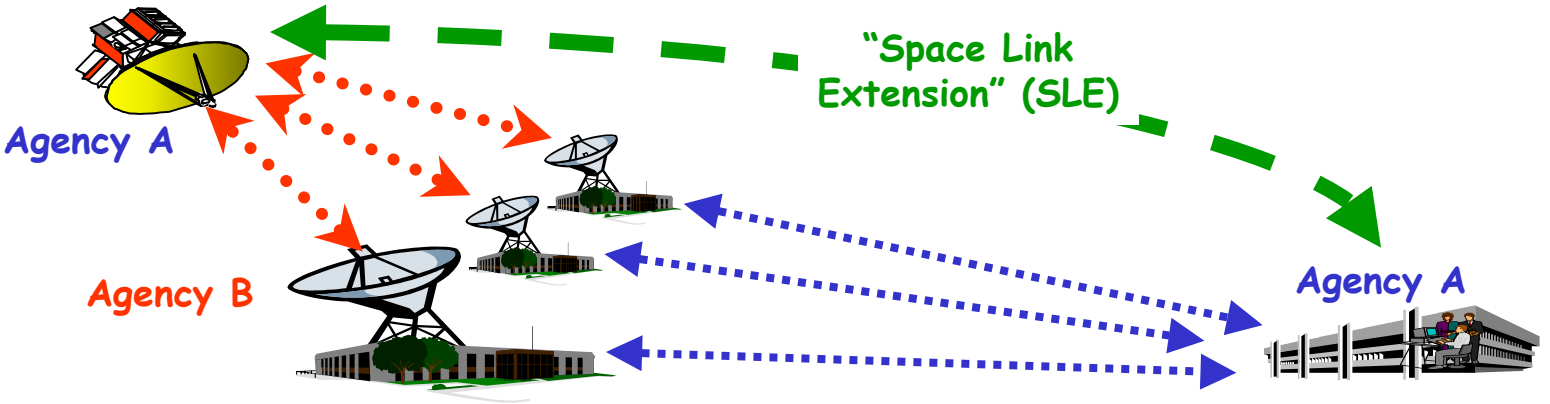
Agencies need to confirm and enhance the SOIS staffing support

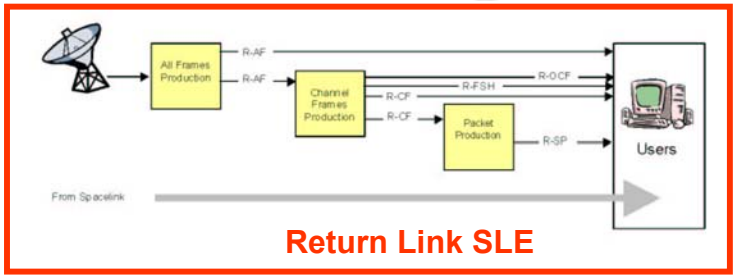
Fall 2004: CESG Area Reports

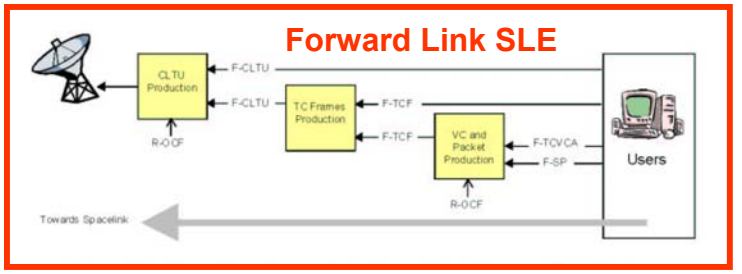
SYSTEMS ENGINEERING SERVICES AREA	Adobe Acrobat Document
MISSION OPS AND INFO MANAGEMENT SERVICES AREA	Adobe Acrobat Document
CROSS SUPPORT SERVICES AREA	Adobe Acrobat Document
SPACECRAFT ONBOARD INTERFACES SERVICES AREA	Adobe Acrobat Document
SPACE LINK SERVICES AREA	Adobe Acrobat Document
SPACE INTERNET SERVICES AREA	Adobe Acrobat Document

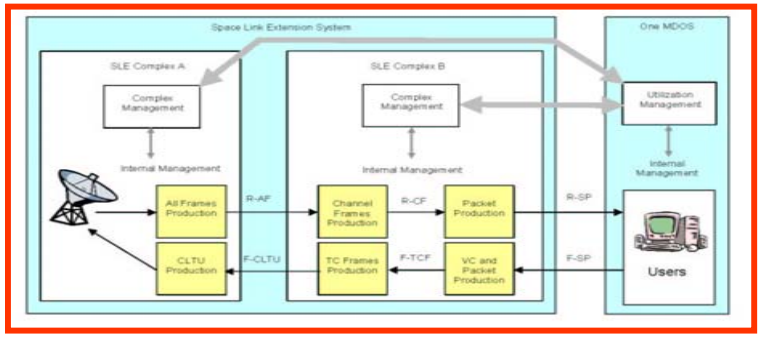
1. Overview of CESG Operations
2. Technical Status: Fall 2004
3. Reports from the Area Directors
4. Special topics:
   - Cross Support Services
   - Telemetry Channel Coding

Concept of "Space Link Extension"



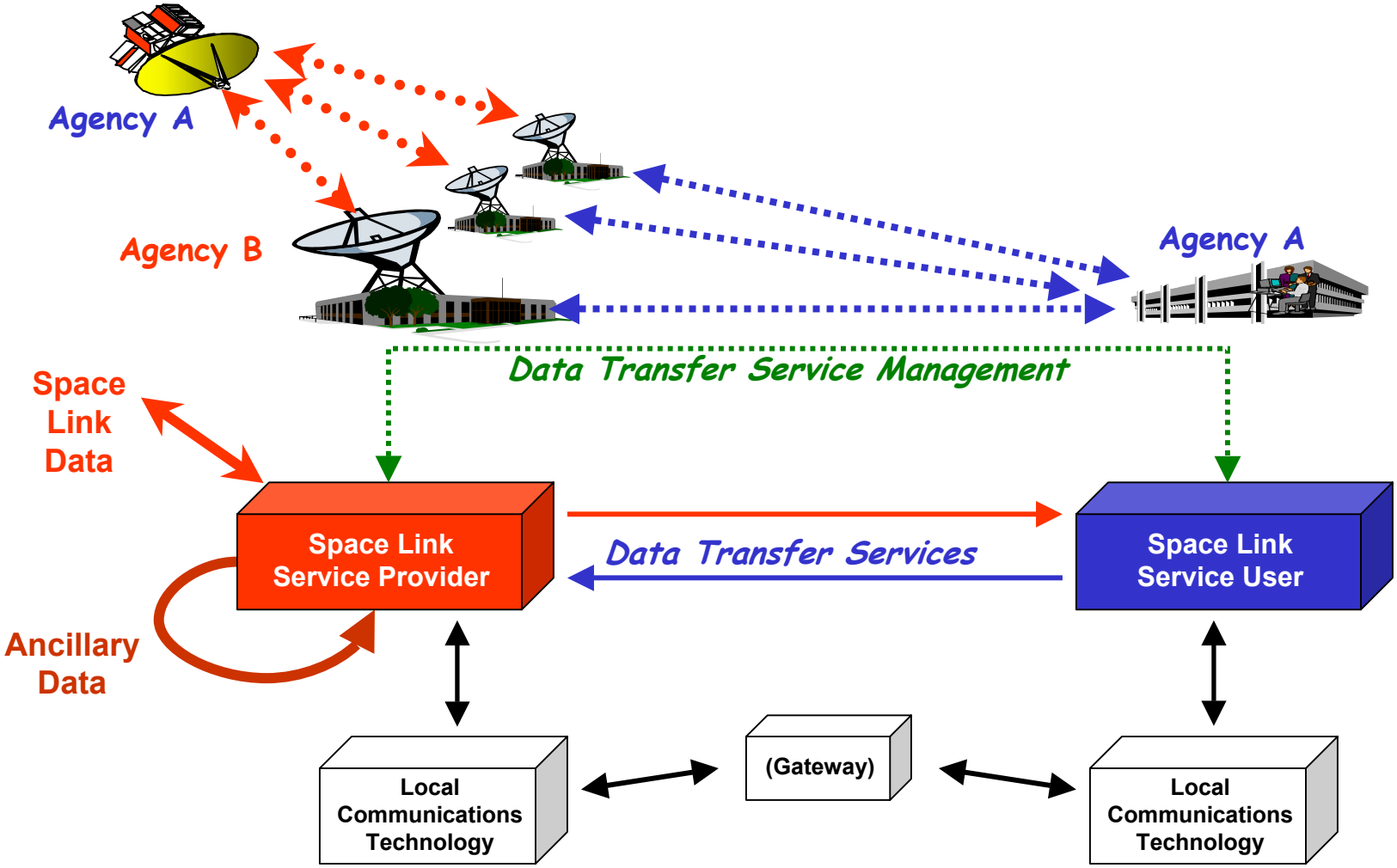




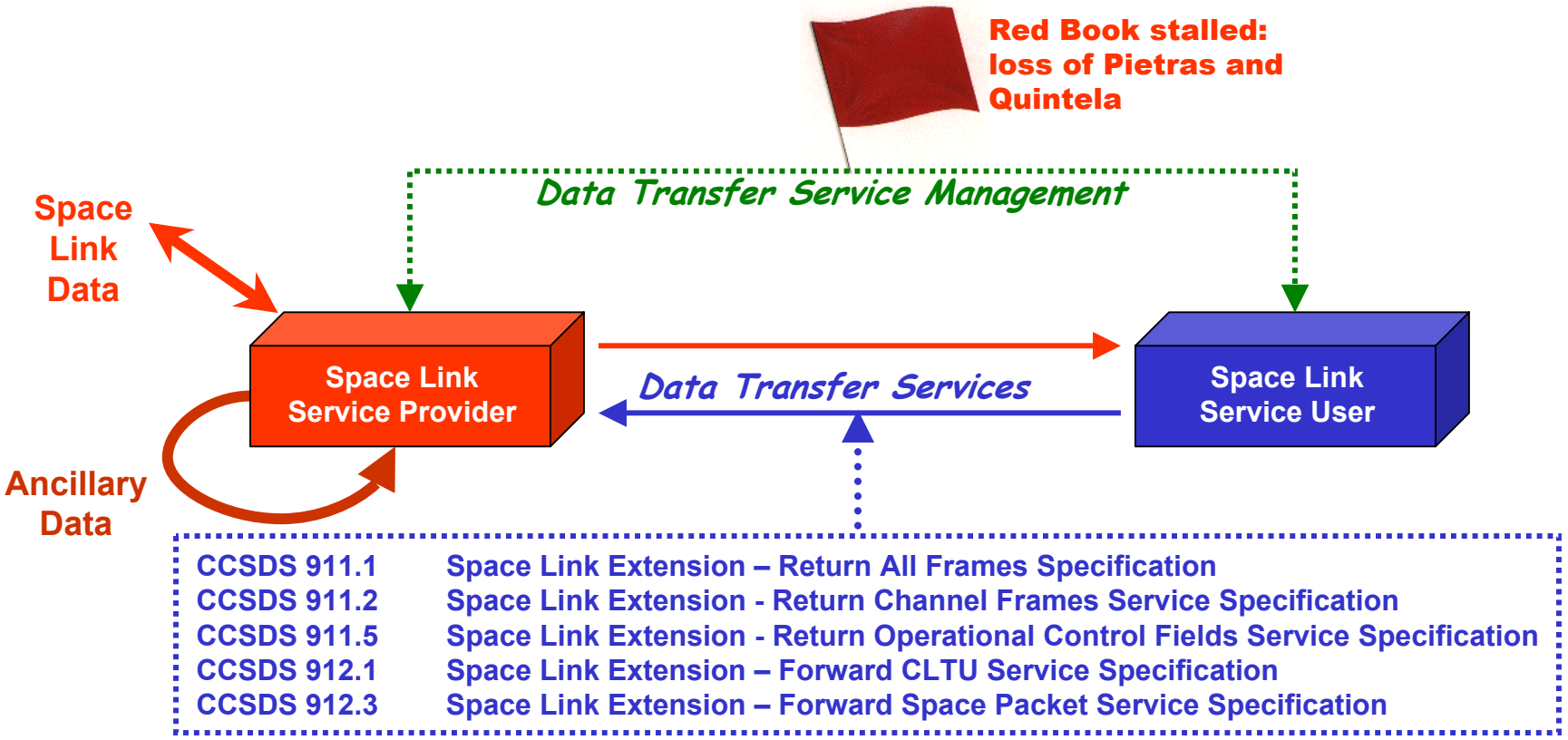


Service Management

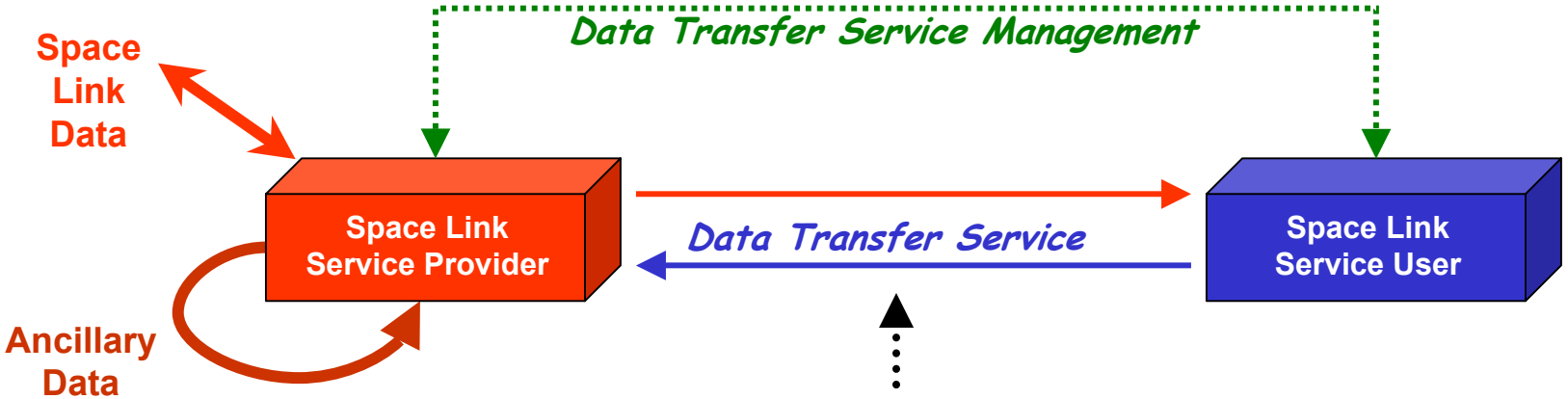
SLE Service Model



Current Status Of SLE

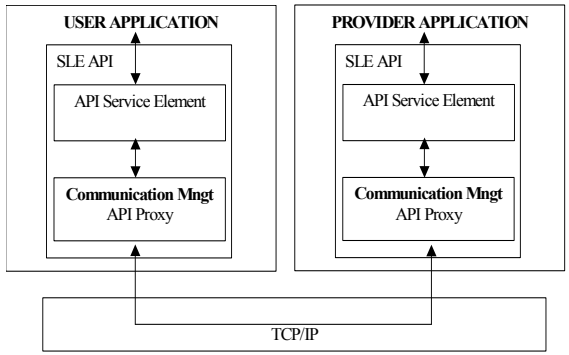


Newly-proposed Cross Support Services

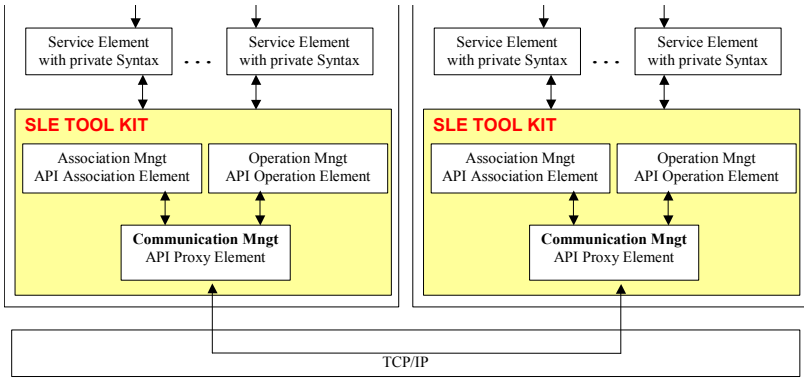


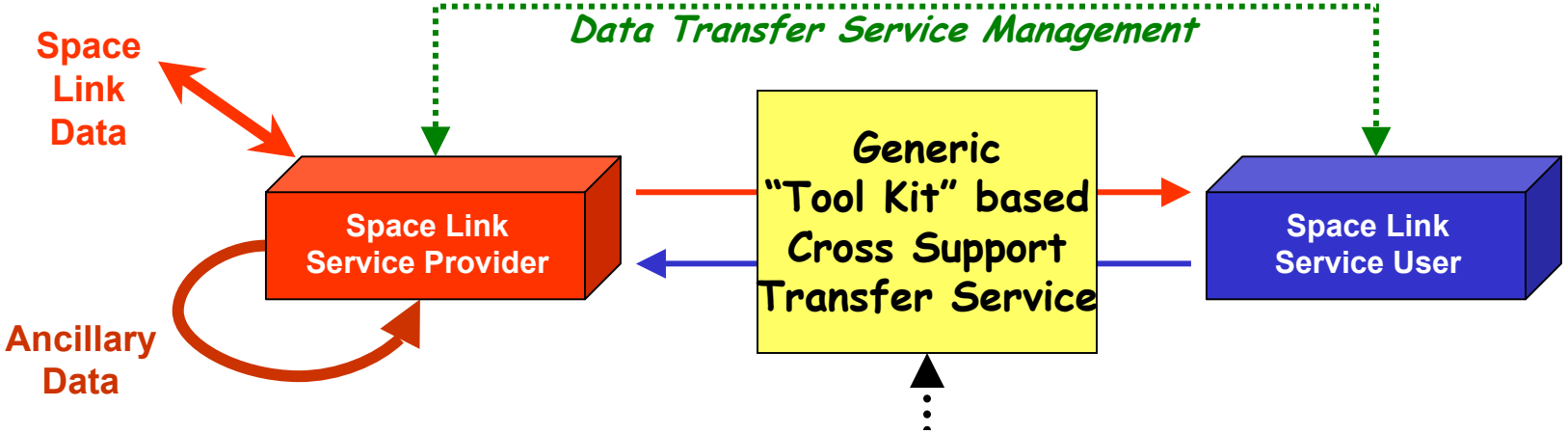
SLE "Super Service" (formerly SLE Return All/Unframed Data)
SLE Radiometric Data (RDM) Service (formerly SLE Navigation)
SLE Expanded Commanding (ExCmd)
SLE Ground Station Monitoring (GSM)

New Concept: Generic "Cross Support Transfer Service



- Define a transfer service "tool kit" that provides the common aspects of the association, operations, and communications capabilities
- "Tool kit" capable of supporting new services implementing each their own syntax





Return All/Unframed Data
Radiometric Data (RDM)
Expanded Commanding
Ground Station Monitoring

} Instances of Generic Service

Generic Transfer Service: proposed WG schedule and resources

Date	Milestone
Spring 2005	Draft Recommendation SLE API Proxy: Mapping to TCP/IP
Spring 2005	Draft Recommendation SLE API Best practices,
Autumn 2005	Draft Recommendation Cross Support Services – Cross Support Transfer Service Specification – Tool Kit
Autumn 2005	Draft Recommendation Cross Support Services – Guidelines for new Service Definition,
Spring 2006	Draft Recommendation Space Link Extension – Return Unframed Telemetry Interface Specification,
Spring 2006	Draft Recommendation Ground Domain – Return Radiometric Data Interface Specification

Lead agency:

- ESA will undertake the lead SLE API Proxy: Mapping to TCP/IP;
- ESA will undertake the lead for the production of the SLE Best Practices;
- JAXA and ESA, will undertake to lead the production of the Cross Support Transfer Service Specification – Tool Kit;
- ESA will undertake the lead of the Guidelines for the definition of new services;
- CNES will undertake the lead for the production of the Return Unframed Telemetry Specification;
- JAXA will undertake the lead for the production of the Radiometric Specification.

The resources required for this working group will be the same as the ones used for the Data Transfer Services Working Group.

Participating Agencies:

- CNES, ESA and JAXA will support the preparation of the deliverables;

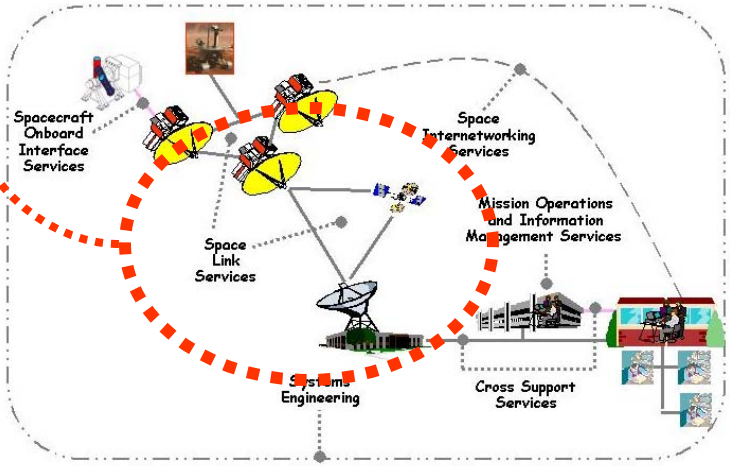
LDPC Codes: Background

First generation CCSDS Channel Coding:

- Convolutional (7,1/2) + RS(255,223): concatenated scheme for power limited but not so severely bandwidth limited TM spacelinks ;
- Turbocodes (rate = 1/2, 1/3, 1/4, 1/6) : combination of 2 recursive convolutional codes : family of codes designed for severely power limited TM links, typically deep space with low to medium data rates. This coding scheme is within typically 1 dB of Shannon limit for a given code rate. It was the ultimate performance, in terms of power efficiency) at the time it was designed.

Second generation CCSDS Channel Coding:

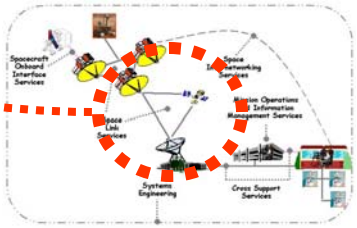
- First generation of channel coding later complemented by new options for convolutional (puncturing to : 2/3, 3/4, 5/6, 7/8) and for RS (RS(255,239,E=8)). These new options were introduced as an interim solution to cover the requirements of near earth, high rate TM links (typically payload TM) for which bandwidth efficiency is of prime importance.



Third generation CCSDS Channel Coding:

- CCSDS is now trying to define a third generation coding scheme based on a recently re-discovered family of codes : **Low Density Parity Check Codes (LDPCC).** This type of codes combines near Shannon limit performance for high code-rates, large codeblocks, simple encoding and high rate parallel implementations of decoding, which makes it the candidate of choice for the next generation of codes for high bandwidth & power efficient codes.
- A LDPC- WG was chartered first to converge on a common set of requirements, and secondly to select a LDPCC family to cover that set of requiements.

LDPC Codes: Status



Third generation CCSDS Channel Coding:

- Converging on a common set of requirements has never been achieved in the LDPCC WG. Emphasis during meetings was more on presenting each agency preferred solution, which in some instances are fairly mature solutions : JPL, GSFC, ESA, CNES.
- After 2 years of fruitless discussions, it was decided at CCSDS spring 2004 meeting to go back to BOF stage so as to converge on :
  - A set of mission profiles
  - A set of requirements per mission profile
  - A set of commonly approved evaluation criteria so as to be able to quantatively and objectively compare solutions
  - A set of criteria weights per mission profile.In fact, the main reason for WG failure to converge on one single solution was the fact that 2 or 3 different classes of missions are targeted by the proposing agencies. Therefore, the weights put by each agencies on each criteria differ. An attempt to cover all missions profile with one family of LDPCC failed.

Current BOF Status:

- ESA has taken the lead to produce the requirements matrix (information data rate, information block length, code rate, energy and bandwidth performance). By the Spring 2005 meeting the requirements should be reviewed and accepted by all participants. A stringent internal review cycle has been defined.
- In parallel to this last effort to reach a consensus on requirements, NASA Goddard and NASA JPL have decided to produce CCSDS Experimental specifications (Orange Books) to advertise to the CCSDS community their preferred solutions.
- GSFC solution is a fixed coderate (8160,7136), r=0,87 optimized for high rate bandwidth efficient links. JPL solution is a family of LDPCC with coderates : 1/2, 2/3, 4/5 optimized for medium rate power and nandwidth efficient links.
- These 2 Orange Books will be finalized and could eventually be used later in the LDPCC WG for the preparation of the Standards track recommendations.