Common Instrument Interface Team Responses to Stakeholder Feedback

Response Date: 5/18/2011

Author	Concern	Recommendation	CII Team Response
Comment #1			
	1) Having weight <= 200 kg as one category 2) No EMI/EMC guidelines	1) Consider options for weight in categories: like <=50kg; 50 to 100; 100 to 200kg and allow power to increase for larger weight. If this option is considered as a guideline, consider having different size constraints. 2) For an auxiliary payload, some guidelines for emitted EMI/EMC should be included.	1) Mechanical Presentation slides 5&6 show the weight categories the CII Team chose: <=75kg and 75 to 200kg. Power is already tiered in 100W increments (100W and 200W) for LEO spacecraft based upon heritgage instruments and should be more than adequate for the mass CII has allocated. (Note: CII will be adding additional tiering of both mass and power for GEO spacecraft/instrument pairings). The two weight categories have different size constraints. 2) The EMI/EMC guidelines are in the spreadsheet files, but were not part of the presentation. Power Guidelines define EMI/EMC shielding. Environmental Guidelines define EMI/EMC environments.
Comment #2			
	Unclear "Class C/D" hardware requirement means there is no cost benefit realized. Also proposals could be viewed as non-compliant and rejected.	CII, or some other organization, should give at a minimum, examples that would act as guidance for how to utilize hardware classes to better manage risk and cost.	The Level 1 Guidelines define the Risk Profile as Class C.
Comment #3			
	The assumption for CII is that it will be a secondary instrument. Analyzing this "class" of instruments created "guidelines" including <=200kg, <=200W, <1m^3. This is substantially less than ESSP missions like CALIPSO and CloudSat, which were primary payloads. CALIPSO had a contributed spacecraft. Would an instrument with a contributed spacecraft fit in EV-I? Even if it didn't meet the guidelines?	Clarify in AO what are compliant vs noncompliant regarding contributions, ICD "guidelines." General Concern – Venture is incompatible with active remote sensing because of cost caps and assumptions on risk and requirement verification.	The CII Team is not affiliated with any AO.

Response Date: 5/18/2011

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Comment #4			
Bob Smith NASA Goddard Space Flight Center	There should be guidelines for what the STS program calls "Analytical Integration." This covers analysis verification and other standards.	Review guidelines to see if they cover the gamut of requirements that are levied on a typical instrument including: safety, testing, reliability, analytical model formats, etc. Include magnetic cleanliness, particular and molecular cleanliness.	The guidelines cannot cover every possible requirement, since some requirements cannot be defined a priori, particulalrly those for unique and never-before-flown science/technology. The CII team either have or will define guidelines for modeling/analysis, magnetic cleanliness, contamination and in the appropriate sections of the document(s). The CII team plans to provide guidelines for testing, or more generally speaking, for verification and validation. It is inappropriate to produce guidelines for safety. Safety is handled via existing requirements imposed by either the launch vehicle provider, the spacecraft and/or instrument developer(s), integrator(s) and/or the launch range safety organization.

Response Date: 5/18/2011

Author	Concern	Recommendation	CII Team Response
Comment #5		1) Rewrite thermal spec 15W/m^2 to include some minimum allowed, such as 15 W/m^2 or 1 W, whichever is greater. 2) Please add temperature sensors (perhaps 2) for monitoring payload when it is off. 3) Raise 2 Mbps number. 4) Write a separate CII spec to cover just data and power interfaces, since this can be standardized early. 5) Standardize spacecraft simulators, and work with vendors or NASA Centers to build/supply them. 6) Investigate GEOS.com for a good software supplier for such simulators as discussed in #5. They supplied simulator software for a large number of NASA missions, including all instruments on a number of missions. 7) Consider defining a standard interface for temperature monitoring via a chip, like APL's "TRIO" (e.g. 16 mux'ed resistance measurements via I2C)	1) The guideline provides a recommended, not-to-exceed flux. This should be used in conjunction with the Mechanical guidelines: specifically, the maximum recommended foot-print. With this information, the payload team has an idea of both the recommended maximum heat transfer and flux transfer. This gives more flexibility to the design team when compared to the often-used interface spec of a not-to-exceed thermal conductance. The comment is well-taken. The guideline lacked completeness, because it did not specifically cite the relevant Mechanical guideline. As such, it appears to penalize payloads for using smaller footprints. The CII team will rewrite guideline to account for the recommended Mechanical foot-print of 600mm x 420mm as shown below. 5 W/m^2 yields a maximum recommended power of under 4W. The next version of the thermal guidelines will expand on the thermal interface conductance to include this include the following statement: "The conduction heat transfer at the Instrument-Spacecraft mechanical interface should be less than 15 W/m^2 or 4 W, whichever is maximum". 2) The instrument designer should assume that spacecraft may not be able to provide temperature monitoring of the payload when it is off. 3) CII has adopted a 2 Mbps baseline data rate for now. SpaceWire supports up to 200 Mbps, which will allow for higher data rates between instrument and spacecraft are paired. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. 4) The CII Team already split apart the power and data guidelines as independent sections of the overall guidelines. 5) The CII team is considering spacecraft and instrument simulators. 6) The CII team will look at that website. 7) The instrument and spacecraft providers will have to consider that when paired.

Response Date: 5/18/2011

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Comment #6			
	Geo-hosted payloads -- GOES, comms etc.	There are two earth science decadal missions (GEO-CAPE, PATH) which are Tier 2/3 missions. It would be helpful to begin discussions of commercially-hosted interfaces (Orbital, LM, SES-American) of nadir and side-mounted nadir interfaces.	The CII team will addres GEO payloads at Workshop #2.
Comment #7			
		Mechanical interface: imported/exported torques/accelerations guidelines should be addressed.	MECH-42 thru 52 in the proposed guidelines address these concerns. The CII Team will re-examine them and release updates in June.
Comment #8			
	Major impediments that instrument provides have in using CII as currently defined: 1) Mismatch of satellite data storage and Spacewire data rate with downlink data rate for once-per-orbit data dump. 2 Mbps x 10 minutes -> 1.2 Gb. Thus imaging data from a LEO orbit with 100 minute period can only be accommodated at a 200 kbps data rate. This imaging data rate would preclude many current day imaging applications. 2) Need a thermal radiator clear field of view to space and/or clear field of view without spacecraft interference to be defined as a guidelines (or at least an option). Need more definte here than currently is. Instrument designers will have no clue if they can be accommodated thermally without getting involved in detail with specific spacecraft providers.		1) CII guidlines do not address spacecraft to ground data rates, only those between instrument and spacecraft. CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates between instrument and spacecraft. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. 2) Feedback was received on the clear field of view (FOV) of space for the instrument radiator(s). The request was to work toward an agreement with spacecraft providers to produce a minimum guaranteed FOV to cold space. While a certain level of cold space FOV may be guaranteed, the uncertainty in orbits, orientations, and nearby surfaces prevents futher specification. And without additional specification, a FOV value has limited value to the payload designer. At this time, the CII Team can only give guidelines that will maximize the chances of utilizing the FOV specified once paired with a spacecraft. The following statement will be included in Thermal Guidelines: “the instrument designer should expect the instrument to be mounted to a side of the spacecraft which could be any of the six sides of the spacecraft (nadir, zenith, East, West, North, and South). The placement of the radiator on the instrument should be flexible such that in any of these S/C mounting configuration, the radiator can have the required view of space. Other recommendations include oversizing radiators to accommodate unexpected blockage from spacecraft or other payload surfaces. Unused area can be blanketed off,… etc

Response Date: 5/18/2011

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Comment #9			
	Imaging applications from space often require a line-of-sight (LOS) jitter much smaller than LOS knowledge or LOS control currently specified as a guideline in SIV.	Suggest that a LOS jitter or LOS rate-of-change limit be added to the spacecraft bus mechanical guidelines. Current guidelines are: a) LOS knowledge -> 0.022° (3σ) b) LOS control -> 0.1° (3σ). C) Suggest adding a LOS rate-of-change limit relative to commanded LOS. LOS rate of change < TBD deg/sec.	This is out of scope for CII, because a secondary payload can not drive the pointing and jitter requirements of the primary mission. For information purposes: The CII team is working to obtain information from the commercial (communications satellite) GEO hosted payload providers.
Comment #10			
	Goals of the CII workshop are admirable. Instrument developes need to understand that they can have better chance of gflying their payload if they "conform" to the guidelines. Soom presentations were excellent; some very sketchy	Recommend "common" standard for presentations! It would be helpful to have folks from spacecraft side represented at the workshop. NASA/OCT will also be very interested in keeping abreast of the CII effort.	The CII Team will tighten up our presentation standardization. The CII team invited spacecraft providers to Workshop 1, and we will focus on bringing in more to Workshop 2. We have already started talking to the OCT.
Comment #11			
	Key capability is pointing, not just accuracy, knowledge and precision. Flexibility is critical for calibration and possible core measurement. The ICD should include a pointing maneuver capability	Include baseline pointing capabilities and maneuvers allowed.	This is out of scope for CII, because a secondary payload can not drive the pointing and jitter requirements of the primary mission. For information purposes: The CII team is working to obtain information from the commercial (communications satellite) GEO hosted payload providers.
Comment #12			
		Create "match.com" for payloads/spacecraft/launch vehicles.	This is an excellent idea. CII will recommend this action to NASA HQ.

Response Date: 5/18/2011

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Comment #13			
	Primary assumption has been that the interface is for secondary payloads. Either need to state Common Interface is not for primary payloads.	- Need to define for GEO also. - Data rates for imagers and hyperspectracl sensors need to be in the range of 300-600 Mbps at least. Downlink needs to be commensurate with these data rates. - Need to include expected pointing stability and pointing knowledge as part of interface. - Recommend a programmatic plan be a programmatic interface. Define what the appropriate/required reviews will be. Can be any of the traditional reviewed be waived or substantially reduced due to the CII? - Consider what common GSE can be available to support the CII. In a sense, have a GSE library that supports the CII, and as programs move into test phase, make it available, being maintained as a NASA resource. - Define 3 envelopes: deployed/operational, launch, and bus, to allow the greatest number of options	1) The CII Team will address GEO payloads at Workshop 2. 2) CII does not address spacecraft to ground data rates, only those between instrument and spacecraft. CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates for spacecraft and ground stations that can support it. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. It's important to recognize that maximum data rates are driven primarily by spacecraft to ground capacity which is outside the scope of CII. To cope with limited data bandwdith, we encourage instrument providers to take full advantage of onboard storage, compression and data summarization and prioritization. This will help to manage downlink capacity and peak downlink data collection times 3) Pointing stability and knowledge is not within the scope of CII, because a secondary payload can not drive the pointing requirements of the primary mission. 4) The CII Team is not involved in the AO process. NASA HQ is still working the programmatic matching at PDR. 5) CII will look at GSE at a future time. 6) The Mechanical guidelines define a launch volume/envelope. Instrument developers should negotiate deployed/operational envelopes and volumes with the spacecraft provider

Response Date: 5/18/2011

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Comment #14		1) The presentations by John Carey on Power and Environmental Guidelines provided no context, no background, and no rationale for the guidelines in these two areas. He just read the guidelines verbatim. He needs to provide background, key considerations, and rationale for the guidelines he presented in future presentations. 2) Bring in a few spacecraft providers to brief for the next workshop. The aerospace contractors are the ones building the spacecraft. 3) Mechanical Interface Guideline presentation was excellent and generated a robust dialog after the briefing.	1) The CII team will add higher level slides providing the background and rationale for the power and environmental guidelines to the presentation. 2) The CII Team will address this at the 2nd Workshop. 3) Thank you.

Response Date: 5/18/2011

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Comment #15			
	1) Not all instruments require a kinematic mount. Is this driven by the spacecraft or can an instrument be direct-mounted or a kinematic mount? 2) Broadcast message details of Spacewire – can this be done? Need more detail for electrical redundancy options with CII. 3) Can all the CII guidelines presented be applied to nadir pointing and spin spacecraft or do the guidelines vary a little for each? Can the SpaceWire interface handle: 4.1) Time synchronization and to what accuracy? 4.2) Side selecting for redundancy 4.3) Redundant electrical interfaces 4.4) Engineering and science telemetry 4.5) Broadcast messaging 4.6) RMAP protocol or just CCSDS packets		1) MECH-9 guideline from the 3-22-11 draft covers this. Kinematic mount is the guideline and allows uncoupled development of the S/C and instrument: "MECH-9: The Instrument should be mounted to the Spacecraft via kenematic mount either 3 or 6 point TBR unless the Instrument Provider demonstrates that kinematic mounts are not required. " 2) Yes, SpaceWire allows for broadcast messages. The CII Data Guidelines define a point-to-point interface between the instrument and spacecraft, which obviates the need for general broadcast messages, since the sender and receiver are always known. SpaceWire supports broadcast messages from the spacecraft to multiple instruments on the SpaceWire bus. 3) The guidelines to date have assumed a nadir pointing (3-axis stabilized) S/C. However, there is nothing precluding the application of the guidelines to a spinning S/C. 4.1) Time syncrhonization through SpaceWire timecodes is possible. Accuracy depends on the SpaceWire clock rate. 4.2) Side selection is outside the scope of CII, but has been accomplished with SpaceWire on JWST. 4.3) See 4.2. 4.4) Yes. 4.5) See (2) above. 4.6) The CII Data Guidelines recommends only CCSDS over SpaceWire, not RMAP. RMAP can be negotiated between the instrument and spacecraft provider at PDR or once the rideshare has been identified.

Response Date: 5/18/2011

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Comment #16			
Robert Knox	Guideline Level 1-5 limiting instrument data rate to 1.5 Mbps may sharply limit science. Maximum instrument data rates of 1.5 Mbps appears inconsistent with discussions of potential SpaceWire throughput < 200 Mbps with available rad-tolerant implementations, < 150 Mbps sustained, in draft data interface guidelines text. Inexpensive instruments of interest for EV payloads over the next decade can easily exceed 1.5 Mbps (e.g., imaging spectrometers, LIDAR samplers).	Adopt a multi-level or tiered standard with 1.5 Mbps as the maximum instrument data rate for a baseline CII, and higher data rate support for spacecraft that can support high data rates and volumes. For example, a spacecraft with an on-board recorder and QPSK X-band downlink might readily support 100 Mbps peak rates and 10-15 Mbps orbit average rates. (Less than demonstrated in a low cost implementation on the EO-1 mission 10 years ago.) A growing ground network infrastructure and increasing data rates from low/moderate cost instruments over the next decade will increase opportunities for high science return from instruments with higher peak and/or average data rates. The CII should be compatible with supporting these capabilities.	CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates for spacecraft and ground stations that can support it. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. It's important to recognize that maximum data rates are driven primarily by spacecraft to ground capacity which is outside the scope of CII. To cope with limited data bandwdith, we encourage instrument providers to take full advantage of onboard storage, compression and data summarization and prioritization. This will help to manage downlink capacity and peak downlink data collection times
Comment #17			
	The group has done a great job on a difficult and thankless task of developing interface standards. I know of what I speak, as I worked for four years on ORS ISET interface standards documents. My only concern is that your standards focus on large payloads for large NASA missions of opportunity. There are a while host of DoD and commercial missions/platforms that can host smaller (<100kg) NASA Science payloads that aren't being addressed. I have enclosed what the ISET developed for a payload standard interface document and would be happy to support your team in development of interface standards for small payloads and spacecraft platforms.		Thank you for your input. We will review your document.

Response Date: 5/18/2011

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Comment #18			
Joe Hackel Ball Aerospace	Scope of Document is May Be Overly Ambitious A 200 W instrument vs. a 50 W instrument is in a different category. Assuming the overarching goal is reducing mission costs, these categories of instruments have non common cost differences. Trying to envelope both categories into one document may defeat the purpose of a common interface.	Recommend dividing the documents into 2 categories 1) Light 2) Heavy The categories can be based on any parameter; however, weight may be a useful metric. Consider weight: An ESPA secondary launch platform permits a max of a 180 kg Observatory (instrument + spacecraft bus). Similarly applying the 180kg limit to a Pegasus launch vehicle creates a useful metric – a Pegasus (or similarly sized) launch vehicle can get a 180 kg Observatory to approximately 850 km, which permits a wide range of useful orbits. Therefore, the simplifying assumption of 180 kg is a useful metric for a “small” (or light) class mission. Dividing the 180 kg Observatory into a instrument and spacecraft bus can be done by assuming a bus of 105 kg (a reasonable value based on similarly sized spacecraft that have flown on the ESPA and Pegasus-class launch vehicles), and 75 kg for instrument. This gives the limit for the light category as 75 kg. Assuming a 75 kg instrument weight will help limit (help define) the mechanical document. For example, certain design assumptions (for example c.g) of an item can be arrived at. It would be safe to assume that a light secondary instrument would likely have a simpler design and interface since its scope would be somewhat less than other, larger instruments. Extending this thought further into a mechanical guideline, the guideline of kinematic mounted interface could be eliminated (a kinematic mount is more expensive and considerably “less simple” than a bolted interface). Once a limiting assumption is made, it can be extended. Assuming an instrument that weighs no more than 75 kg, it is reasonable to assume that it is limited in power needs. Assigning an arbitrary but reasonable value (say, 100 W) to the instrument for the power section helps define that power and the requirements that flow out of it.⍰⍰This thought process can be expanded into all the Level 1 guidelines and flow into the documents and define the common interface for a “light” category. Working through and setting limits for the “light” category, will streamline the “heavy” category and overall simplify the effort of creating the document(s).	The lower mass limit currently defined by the CII team (< 75 kg) aligns to what has been recommended. Although it was not addressedd fully in the presentation, the payload power is also bifurcated into two (2) 100 Watt services to allow for smallerr payload needs. However, limiting the payload mass considered by the CII team based upon a notional primary mission with a Pegasus-class LV is outside the scope of the CII Team's direction. The CII Team selected kinematic mounts to provide a S/C interface which would be physically consistent, analytically well defined and thermally stable wrt both the payload and the S/C.

Response Date: 5/18/2011

Author	Concern	Recommendation	CII Team Response
Comment #19			
		General Need to address certification and testing Would be useful to have some form of catalog showing examples of CII attempts and successes as well as products that have been built to the CII guidelines. Would be useful to have a catalog of rideshares with any unique features Seems like many of the “should” statements should be “shalls”	The CII team plans to provide guidelines for testing, or more generally speaking, for verification and validation. CII will add success and lessons learned to our web page in the future. The catalog is a great idea and we will coordinate that with HQ. We used the word "should" because CII does not levy requirements.
Comment #20			
		Level 1 Guidelines Level 1-2 states 2 year mission yet the Environmental guidelines quotes a 3 year mission life. Would prefer the longer one. Level 1-5 states the instrument data rate should be < 1.5Mbps. A single SpaceWire link will provide at least 150 Mbps. There is a major mis-match and it needs to be increased.	1) The CII team will revise the Environmental guidelines to match the Level 1 guidelines. 2) CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates for spacecraft and ground stations that can support it. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. It's important to recognize that maximum data rates are driven primarily by spacecraft to ground capacity which is outside the scope of CII. To cope with limited data bandwdith, we encourage instrument providers to take full advantage of onboard storage, compression and data summarization and prioritization. This will help to manage downlink capacity and peak downlink data collection times.

Response Date: 5/18/2011

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Comment #21		Data Guidelines DI-1 A single SpaceWire link does not provide enough bandwidth for all missions. Recommend making one link required and up to 3 additional links optional where commands and acknowledgements could be restricted to one redundant set of links or allowed to occur on any. Combining data from separate links is not a hard problem. DI-4 – “space wire” should be “SpaceWire” DI-5 – Change from “the following” to “a” DI-6 – This does not match the every 30 seconds in the data interface document DI-7- This message should be standardized in the data interface document DI-8 – Until the SpaceWire standard is changed, the default clock rate is 10 MHz. DI-10 – change from “the following” to “a” DI-11 and 12 – “space wire” should be “SpaceWire” DI-16 – remove “parameter definition per” DI-22 – SpaceWire standard does not address grounding for harnesses that must be placed in chambers. This may want to be overruled here.	CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates for spacecraft and ground stations that can support it. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. It's important to recognize that maximum data rates are driven primarily by spacecraft to ground capacity which is outside the scope of CII. To cope with limited data bandwdith, we encourage instrument providers to take full advantage of onboard storage, compression and data summarization and prioritization. This will help to manage downlink capacity and peak downlink data collection times The CII team will address the typos and minors inconsistencies raised by your very careful read of the CII Data Guidelines in the next revision. Thank you! General grounding will be covered in another section, but ground testing is out of scope for CII.
Comment #22		Modes Specification 1.2 and 1.3 – The OFF mode should be switched to the SURVIVAL mode after launch. Thus there is no need to have an on orbit “OFF” mode and it would keep the survival heaters only used on orbit. 1.3.1.3 – 120 minutes seems like a long time to be in space without a heater. 1.4.1.4 – seems like this needs more definition and or control. As soon as power is applied, this should start sending H&S or should it wait for a command or only after a certain time (10 seconds?) 1.6.1.4 – This may need to be defined as a message from the instrument to the spacecraft – or it could be included in the telemetry though that would involve up to a second wait.	1) 1.2 and 1.3 - The modes are valid for ground and spaceborne operation, and they need to be consistent. 2) 1.3.1.3 - 120 minutes is based upon heritage instrument timelines. This should be negotiated between the secondary instrument and spacecraft providers. 3) We will elaborate on 1.4.1.4 in a follow-on version of the document. 4) 1.6.1.4 is already included in telemetry.

Response Date: 5/18/2011

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Comment #23		Data Interface 3.1.1 – BAE Systems has flown (on LRO and LCROSS among others) an ASIC that can run each SpaceWire link to 264 MHz. We have recently fabricated two new ASICs that can run each link to 320 MHz. Suggest you set the upper limit around 400 Mbps. 3.1.1.1, 3.1.3 – Should allow up to four redundant SpaceWire links to allow up to 1 Gbps of aggregate bandwidth. Figure 3-1 – To use a Protocol ID, you must follow the standard exactly. If the CRC is allowed, than you can use 0x02; otherwise you need a new protocol ID. Next paragraph – need to rewrite to allow routers In the instrument and thus a combination of path and logical addressing. Page 7 1st paragraph – reference to UCTP document doesn't match front applicable documents 3.2.2 – Should you not require an ACK for the message? Also It may be worth a discussion on how much variability may be in the time message update. 3.2.3 – Should you not require an ACK for the message? 3.2.4.2 – to match higher level guidelines, this should be 10 (TBR). 3.2.4.3 – recommend adding a command to start and stop telemetry. 3.2.5.1 – As written, doesn't make sense. Need to write from the Ack point of view and then reference the prior section. You may want to create a class of messages for the Instrument to the Spacecraft such as reporting SAFE mode. 3.2.5.3 – Need to define 0b11 as invalid and add a status to table 3-4 for this. Assume you reject all commands with bad CRC – should be stated Table 3-4 – should have a status for an invalid command 3.2.6.3 – need to define 0b11 as invalid. 3.2.7.2 – need to allow for the acknowledgement and telemetry traffic in these numbers. 3.3 – 256 byte cap not adequately explained. Why can't it be higher? Need to allow more lanes	CII will adopt a 2 Mbps baseline data rate. SpaceWire supports up to 200 Mbps, which will allow for higher data rates for spacecraft and ground stations that can support it. In general, higher data rates can be negotiated at PDR or when the rideshare has been identified. It's important to recognize that maximum data rates are driven primarily by spacecraft to ground capacity which is outside the scope of CII. To cope with limited data bandwdith, we encourage instrument providers to take full advantage of onboard storage, compression and data summarization and prioritization. This will help to manage downlink capacity and peak downlink data collection times The typos and minors inconsistencies raised by your very careful read of the CII Data Guidelines will be fixed in the next revision. Thank you! The CRC can be embedded in the data cargo which is consistent with the SpaceWire Protocol ID CCSDS specification. We will consider adding a command to start and stop telemetry. The 256 byte cap is based on a recommendation from Northrop Grumman given their extensive JWST SpaceWire experience. We believe they conducted a trade-study with different SpaceWire packet sizes and will followup with them.
Comment #24		Power Guidelines The title says Power Guidelines but the introduction calls it an ICD. Need to be consistent.	The CII team has fixed the inconsistencies in the Power Guidelines.

Response Date: 5/18/2011

Author	Concern	Recommendation	CII Team Response
Comment #25			
		Mechanical Guidelines This document should address all connectors and cable.	The Power Guidelines will address electrical connectors and wire harnesses.
Comment #26			
	I attended one day CII Workshop at the Marriott Inn and Conference Center on April 21. I commend the organizers for taking lead in this area. NASA understands the instruments and spacecraft so they are accomplished to lead this activity. The commercial satellite companies do not understand the instruments interfaces and requirements. So, this is good effort to start with. I attended hosted payload workshop which was largely commercial satellite companies, CII was not discussed to be followed.	I would recommend that you include active participation by commercial satellite operators. Looking forward to your next workshop with some progress.	The CII group is actively reaching out ot spacecraft providers to get them involved in Workshop 2.