Telecommunications Industry Association
FO-2 Committee on Optical Communication Systems
FO-6 Committee on Fiber Optics (meeting No. 47)

June 16, 2000
Le Chateau Frontenac
1, Rue Des Carrieres
Quebec, Canada G1R 4P5

Next Meeting**: Palm Springs, California January 11, 2001**

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1 Introductions

The 3rd joint meeting of the FO-2/FO-6 Committees was called to order at 1:40 P.M. on June 16, 2000 with Felix Kapron (FO-2 Chair) presiding. A total of 25 attendees, including 10 voting members (or their representatives) and 15 others were present. A quorum for the combined Committees was established. The meeting conducted a round of self-introductions.

	Company	**E-Mail**	**Telephone**
Chairs:			
Felix Kapron	Corning Inc.	kapronfp@corning.com	607-974-7156
Voting Members Companies present:			
Ron Bossard	3M	rgbossard@mmm.com	512-984-3782
Kenneth Bow	DOW	kebow@dow.com	517-638-3759
Gair Brown	NSWC DD	gdbrown@nswc.navy.mil	540-653-1579
Allen Cherin	Lucent	cherin@lucent.com	770-798-2619
Rex Craig	NIST	rcraig@boulder.nist.gov	303-497-3359
Osman Gebizlioglu	Telcordia Technologies	ogebizli@telcordia.com	973-829-4956
Andre Girard	EXFO	agirard@exfo.com	418-683-0211
Tom Hanson	Corning Inc.	hansonta@corning.com	607-974-4530
Dennis Horwitz	RIFOCS	dennis.horwitz@rifocs.com	805-389-9868
Arthur Hudson	Defense Supply Center	arthur_hudson@dscc.dla.mil	614-692-0657
Voting Members Companies Not present:			
Dan Fletcher	Alcatel	dan.fletcher@cable.alcatel.com	704-459-8544
Jack DuPre	Hewlett-Packard	jack_dupre@hp.com	331-39-19-1245

Other Participants Present:

Anne Marie Auchu	Corning Inc.	auchuam@corning.com	607-974-7307
Thomas Ball	Lucent Technologies	Teballzz@aol.com	717-939-8537
Eric Bobinsky	Ocean Design, Inc.	ebobinsky@oceandesigninc.com	440-243-2992
Marc Breton	EXFO Inc.	marc.breton@exfo.com	NA
Robert Gallenberger	SPAWAR-SC	gallenbe@spawar.navy.mil	619-553-3415
Rob Johnson	Corning Incorporated	johnsonr@corning.com	607-974-7359
Mike Kinard	Lucent Technologies	mkinard@lucent.com	770-798-2109
David Leight	DSCC-VAT	david_leight@dscc.dla.mil	614-692-0521
David Maack	JDS Uniphase	david.maack@usjdsunph.com	860-769-3952
Jim Matthews III	Corning Inc.	matthewsje@corning.com	607-974-7608
Stephanie Montgomery	TIA	smontgom@tia.eia.org	703-907-7735
Bruce W. Netherton	Spectra-Physics	bnetherton@splasers.com	530-532-6185
Dan Roberts	Optical Coating Lab. Inc.	dan_roberts@ocli.com	707-525-7908
Greg Smith	Corning Inc.	smithge@corning.com	607-974-7134

F0-2/FO-6 Member/Alternate) attendance history:

Company /Affiliation	Member / Alternate	Jan. 1998	June 1998	Jan. 1999	June 1999	Jan. 2000	June 2000
3M	Ron Bossard	X	X	X	X	X	X
Alcatel	Dan Fletcher	X	X	X	X	X	
Corning	Thomas Hanson	X	X	X	X	X	X
DOW	Kenneth Bow	X		X			X
DS CC – DoD	Art Hudson	X	X	X	X	X	X
EXFO	Andre Girard	X	X	X	X	X	X
HP	Bob Musk/ J. DuPre			X	X		
Lucent	Allen Cherin	X		X	X	X	X
NIST	Rex Craig	X		X	X	X	X
NSWC, Navy	Gair Brown		X				X
RIFOCS	Dennis Horwitz	X		X	X	X	X
Telcordia	Osman	X	X	X	X	X	X

	Gebizlioglu						

Note: Companies absent from three consecutive meetings will be removed from the voting member list and placed on the nonvoting member list. Please make sure attendance sheets are signed. The chairman will notify a company of their failure to meet minimum participation requirements and request their attendance at future meetings; enforcement of the membership continuation rules is necessary in order to maintain our ability to raise a quorum at our meetings.

2 Chairpersons' Opening Remarks

FO-2 chairperson, Felix Kapron reminded everyone that the FO-2 and FO-6 meetings were being held jointly to reduce redundancy and have a more efficient, productive meeting. Felix mentioned that FO-6 chairperson, Steven Swanson had another commitment and sent his regrets at being unable to attend.

Tuesday Night Tutorial

The Tuesday night tutorial was replaced with a tour of the National Institute of Optics that was very informative and well received.

3 Review / approval of agenda

The proposed agenda was approved with no corrections, changes or comments.

4 Approval of Previous Meeting Report

The previous meeting report was approved with the following corrections: table of contents changed to include FO-6.9 and p. 21 correction from lighting to lightning. Move to accept by Arthur Barlow, second by Osman Gebizliogu. Action items from the San Juan meeting were reviewed and all have been completed.

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5 Correspondence

Advisory Note 26 –Re: *No Geographical Restriction for Participation in Formulating Groups* was reviewed.

6 TIA Update, by Stephanie Montgomery

- Reflector initiation – All subcommittees and some working groups have a reflector set up, and TIA is in the process of setting up reflectors for the remaining working groups.

- Sub-committees need to get agendas to TIA three weeks before meeting.
- Use web-site forms rather than down-loaded forms.
- Use FTP site for large size documents and to keep committees, sub-committees and working groups current.
- FTP sites now available for all groups. All the chairs and committee members are encouraged to use the FTP sites.
- tiafoxx – user name (all lower case)xx being number of committee password is 1foxx.
- Several meetings were canceled this session. In the future please let Stephanie know that a meeting was canceled so she can keep all attendees aware.
- New engineering manual going out for ballot – June 30. Ballot resolution in September. Possibly chairs elected / re-elected in January if new Engineering Manual adopted.
- Computer projectors are now available from TIA. Please contact TIA representative for reservation of projector.

7 FO-2 Subcommittee Chairman Reports

FO-2.1 Single-Mode Systems, by Allen Cherin

International Reports

IEC SC 86C/WG1 May meeting on Fiber Optic Subsystems
Allen Cherin reviewed progress of the meeting in London. First there were the documents in progress:

61280-2-8, *Accelerated measurement of low BER in digital fibre optic systems*
This went through CD, and it was decided to combine the methods of OFSTPs 8 & 9. 86C/290/CD was circulated on Aug. 11, and voting closes on Nov. 15.

61282-6, Guideline for skew design in parallel optical connection systems
This became 86C/292/NP circulated on Sept. 1, closing on Dec. 15.

61280-2-9, *OSNR measurement*
This became 86C/290/CD circulated on Aug. 11, closing Nov. 15.

Other IEC documents are reported on below.

Several new work areas were identified:
- Gigabit Ethernet optical link model – the contents of a guideline to explain and support the Del Hanson (Agilent Technologies) GbE link model will be discussed at the September meeting of WG1 in Stockholm.
- Tom Hanson of Corning made a proposal to convert FOTP-203, *Launched power distribution measurement* into an IEC measurement standard. This will be reviewed at the next meeting of WG1.
- ITU Recommendation G.dsn. Editor Felix Kapron will create a table of contents, and highlight areas of IEC support. Two that were identified are:

- The creation of statistical design guidelines for attenuation, chromatic dispersion, and PMD.
- Measurements for multichannel systems.

Other Status Reports
OFSTP-8, *Accelerated Measurement of BERs and Q-factor by the sinusoidal method*, and
OFSTP-9, *Accelerated Measurement of BERs and Q-factor by the variable threshold method*
As a result of later discussions in FO-2/6, OFSTPs will be converted to FOTPs. OFSTP-8 by Rick Neumann will become FOTP-215, and OFSTP-9 by Rajender Razden will become FOTP-216. Both are out as Sp ballot. Note that these have been combined in the IEC.

Status of draft OFSTP-5, *Data Analysis of Bit-Error Ratio vs. Received Power in Digital Fiber Optic Systems*
The editor Dick Kirk of Nortel said that no comments had been received in the Letter Ballot, so it will go to SP ballot.

Status of draft OFSTP-6, *Measurement of Optical Signal-to-Noise Ratio*
This has been approved for publication.

Status of IEC 61282-3, *Guidelines for the Calculation of PMD in Fibre Optic Systems*
Tom Hanson of Corning is the editor, and 86C/296/CDV circulated on Oct. 27, with voting closing on March 30.
Systems Testing
Arthur Barlow of PerkinElmer described a modulation phase shift method (also given in FO-6.6.5, and in ballot for components in FO-6.3.5). It measures the group velocity as a function of input polarization states and wavelength. The maximum delay difference is the DGD vs. wavelength. (The corresponding chromatic dispersion can also be obtained.) Good resolution is obtained for DGDs from 1 ps to over 1 ns. It can obtain the PSP components and second-order PMD as well.
It was decided that Arthur could give a presentation at the next IEC SC86C WG1 meeting.

Status of IEC 61282-5, *Guidelines to accommodate and compensate for dispersion in fibre optic systems*
Felix Kapron is the editor, and 86C/291/CDV circulated Sept. 11, closing on Jan. 15.

Status of IEC 61282-4, *Guidelines to Accommodate and Utilise Nonlinear Effects in Single-Mode Fiber Systems*
Felix Kapron is the editor, and this was sent to the Central Office on Oct. 25.

Spectral Bands
Felix Kapron presented a proposal (also discussed in FO-2.1.1), which was finalized later in September meetings of IEC SC86C WG1 and the ITU-T Q.16/15. The final result is:

Band	**Descriptor**	**Range (nm)**
O-band	Original	1260 to 1360
E-band	Extended	1360 to 1460
S-band	Short wavelength	1460 to 1530
C-band	Conventional	1530 to 1565
L-band	Long wavelength	1565 to 1625
U-band	Ultralong wavelength	1625 to 1675

♦ The definition of spectral bands is for classification purposes only and not for specification.

- The classification for multimode fibers is for further study. The region 770 nm to 910 nm has been proposed.

It is anticipated that in the near future, various applications, with and without optical amplifiers, will utilize signal transmission covering the full range of 1260 nm to 1625 nm. Use of the region above 1625 nm for non-transmission purposes must be done on a basis of causing negligible interference to transmission signals.

FO-2.1.1 WG on Optically Amplified Devices, Subsystems, and Systems

IEC Activities and Round Robins

NIST representatives reported on efforts to produce a reference artifact for RIN MAP. Additional efforts in the area of noise artifacts were discussed, with participants asked to consider the alternatives of a "special test" versus efforts for reference artifacts. It was noted that efforts in optical spectral power density would be valuable, but at the moment, NIST resources were limited due to staffing.

Adoption of IEC Test Methods as TIA / ANSI Documents

The chair noted that the SP ballot had closed, with favorable votes without comments for the following documents. It was the consensus of FO 2.1.1 that these documents should be passed forward to TSSC and publication. The documents agreed for advancement to publication are:

SP-4496	TIA/EIA-455-206*	IEC 61290-1-2	Gain by ESA
SP-4497	TIA/EIA-455-207*	IEC 61290-1-3	Gain by Power Meter
SP-4498	TIA/EIA-455-208*	IEC 61290-2-1	Power by OSA
SP-4499	TIA/EIA-455-209*	IEC 61290-2-2	Power by ESA
SP-4500	TIA/EIA-455-210*	IEC 61290-2-3	Power by Power Meter
SP-4501	TIA/EIA-455-211*	IEC 61290-6-1	Pump Leakage - Optical Demux
SP-4502	TIA/EIA-455-212*	IEC 61290-1-1	Gain by OSA
SP-4503	TIA/EIA-455-213*	IEC 61290-7-1	Out of Band IL - Filtered Power Meter
SP-4801	TIA/EIA-455-214*	IEC 61291-1	Generic Spec (Terms and defn's)

* Note: The original intent was to convert the IEC documents to OFSTPs. Subsequently, a decision was made to designate all FO-2 and FO-6 documents as FOTPs. The numbers stated are the FOTP numbers assigned to the adopted IEC documents.

The WG reaffirmed that wherever possible, the industry is better served by having a single test method for optical amplifiers, and we should continue to adopt the IEC 61290 series of documents as they become available. All changes and improvements will continue to be directed to IEC SC86C WG3 as they work to improve the documents in future revisions. FO 2.1.1 agreed to seek SP ballots for adoption of the following two test methods:

- IEC 61290-3: Optical fibre amplifiers – Basic specification – Part 3: Test methods for noise figure parameters
- IEC 61290-5-1: Optical fibre amplifiers – Basic specification – Part 5-1: Test methods for reflectance parameters – Optical spectrum analyser.

It was the feeling of FO 2.1.1 that the current ballot registration process of TIA is seriously flawed, and detrimental to the progress of the standardization work. Some members reported not receiving the call

to register, which will be discussed with TIA staff, and all members were concerned that the process should be replaced with a better alternative. It was the consensus of FO 2.1.1 that the voting pool for documents should automatically include voting members in good standing of the document's formulating group.

An additional discussion of international and domestic standards documents led to the following observations. As long as the process for creating an international (IEC) standard is open and the concerns of TIA constituents are addressed, then we should proceed as follows:

- Where the international standard exists first, and no TIA standard exists, adopt the IEC standard as an ANSI / TIA document.
- Where the TIA standard exists, and is subsequently agreed as an international standard, adopt the international standard as an ANSI/TIA document and rescind the FOTP / OFSTP
- Where no standard exists, work to achieve consensus on a draft and propose as an international (IEC) standard, with subsequent adoption. Depending on timing and market need, formalize the draft as a TIA ITM or FOTP/OFSTP if the process can be completed before introduction as an IEC document, although this is not essential.
- It was noted that there is a process that would allow "Fast Track" adoption of a published TIA document as an IEC document, but this method is seldom used, and would likely be successful only for extremely non-controversial documents.

Other Business

It was noted that other groups such as OIF have emerging physical layer groups, which at least for now, are drawing large numbers of people as participants. Discussion indicated it is important for groups like TIA and T1 to make sure that we promote the awareness of the work that is done here. T1 recently agreed to look at efforts to promote its activities to fora and industry groups. It was suggested that TIA should also look at doing the same, with an example being a liaison to OIF, outlining the TIA groups and projects, and requesting their inputs and needs which could be served by TIA FO groups. The chair agreed to advance such a concept to the FO 2.1 and FO 2 / 6 level.

Future Meetings

The group agreed to a teleconference in late August to review ITU-T Experts Meeting contributions, with a date to be announced once the contribution deadline was known. The next physical meeting is planned in October 2000, jointly with T1X1 in Baltimore Maryland.

FO-2.1.2 WG on Single-Mode Transmission Design

- Gair Brown indicated that the working group has decided to proceed with their current projects as a correspondence group and not physically meet until a future unspecified time.

- The efforts to develop an informative guide, in the form of a TSB, on Single Mode Transmission Design are continuing. The working group has developed a proposed structure for the document that is modular in nature, so that differing design problems can be separately addressed. At this time, draft versions of introductory sections are available and a section for a single channel system design problem is being formulated. The current plan is to finish the development of the single channel system design section by January and to provide a brief on the document content to FO-2.1.

- At present the working group is limited in resources and solely focused on the development of the single mode design TSB. It was noted that the work on the TSB could easily continue via electronic correspondence and that, at this time, meetings of 2.1.2 were not necessary to continue progress. It was recommended that the FO-2.1.2 working group go into dormancy until working group meetings are necessary to continue progress. There were no objections.

FO-2.2 Digital Multimode Systems by Gair Brown

Report of Working Group FO 2.2.1

- M. Hackert (Corning) reported on the activities of FO 2.2.1. The WG has completed the experimental validation of the proposed new source and fiber specifications for improving link performance. Of the extensive set of source fiber combinations (over 1000) studied in the validation experiment, only one combination (which met the both the encircled flux and restricted launch modal bandwidth) exhibited unacceptable system performance.

- FOTP-203 (Launched Power Distribution Measurement Procedure for Graded Index Multimode Fiber Transmitters) is out for SP ballot. The ballot will close on 7/19/00. With the reorganization of FO-6.5 (the official originating subcommittee of the procedure) to become FO-2.3, there is an issue with the development of a component test procedure in a systems subcommittee. One solution would be to request a component subcommittee to act as the originating subcommittee.

- FOTP-204 (Measurement of Bandwidth on Multimode Fiber) is out for SP ballot. The ballot will close on 6/16.
  - Experimental study of high data rate (10 Gbps) transmission over 50-micron fiber is just starting. The goal is to demonstrate 10 Gbps transmission using short wavelength VCSELs over distances up to 300 m for worst case combinations of sources and fibers. The same general approach will be used as was used in the 62 micron 1 Gbps study. The working group will develop the initial experimental design during the next working group meeting. In addition, a new modeling effort has been initiated at Lucent to look at this problem. Because of IEEE standards development schedules, the working group plans to complete initial validation activities by November of 2000 and to complete final validation activities by May of 2001.

- 100 Mb/s Physical Layer Medium Dependent Sublayer and 10 Mb/s and 100 Mb/s Auto-Negotiation on 850 nm Fiber Optics (SP-4360-A-1, TIA/EIA-785)
  - Comments were submitted during the last default ballot, which were outside of the ballot scope. A ballot was circulated to obtain consensus to reopen the document to address the comments and re-circulate the document on a new SP ballot. The author (C. Montstream) provided a summary of the comments received with proposed changes to resolve each. Once the detailed document changes identified have been drafted, the author will distribute to the changes to the FO-2.2 reflector for informal review.
  - The subcommittee approved the circulation of the document on a SP ballot after the document changes have been reviewed on the FO-2.2 reflector.

FO-2.3 Opto-Electro-optic Sources, Detectors and Devices, by Bob Gallenberger

- FOTP-126 (Measurement of LED Spectral Characteristics) published February 2000.

- FOTP-142 (Measurement of Modal Noise Power Penalty for Laser Sources), PN-4102. The current version of this FOTP differs considerably from an early draft, which resulted from an IEEE working group on modal noise, and has generated considerable controversy within and outside the subcommittee. The basic difference between the two versions is that the original method bases modal noise power penalty on BER measurements; the current version is based upon noise measurements. A teleconference was held in March to resolve differences. Interested FO-2.3 members and several members of the original IEEE working group participated. Author, Gair Brown, will revise current draft. Subcommittee voted to request PN Letter Ballot of new draft.
- Proposed FOTP for Measurement of Receiver Eye Width - Author, Richard Kirk. No progress to date. The author will attempt to have a draft ready for review /discussion prior to the January meeting.
- Proposed FOTP for Measurement of Frequency Response of Digital Receivers – Consensus of subcommittee was to proceed with development of this FOTP. Robert Throm will be author. Goal is to have a draft ready for subcommittee review at next plenary. Chairman will request PN prior to next meeting.
- FOTP-203 (Launched Power Distribution Measurement Procedure for Graded- Index Multimode Fiber Transmitters) SP ballot closed on July 19. All technical and editorial comments have been resolved. No additional comments are expected.
- Rick Neumann recommended initiation of an OFSTP for measurement of mode partition noise "k factor", which is a serious problem for 10 Gbit-ethernet. Gair Brown will attempt preliminary measurements and report at the next plenary in January 2001.

FO-2.4 Optical Terms, Definitions, Document Control, and Safety, by Joyce Kilmer

- The sub-committee did not meet in Quebec City, Quebec. There was a unanimous vote to disband the sub-committee. The terminology document 440 would remain under the administration of FO-2/FO-6.
- A proposal to combine all the terminology documents into one document was made. Stephanie Montgomery was to investigate the proposal with Dan Bart. Frank Stein, consultant for TIA was recommended as the potential editor.

FO-2.5 Outside Fiber Cable Plant Installation, by Paul Devaney

- The sub-committee did not meet in Quebec City, Quebec. There was a unanimous vote to disband the sub-committee.
- Administration of Document 3506 590A (Standard for Physical Location and Protection of Below-Ground Fiber and Optic Cable Plant) retained in FO-2/FO-6 until FO-6.7 decides disposition.

FO-2.6 Reliability of Fiber Optic Systems and Active Optical Components, by Pin Su

Formerly FO-2.6/6.10 on Reliability of Fiber Optic Systems and Active Optical Components

The agenda was approved as published with the addition of a presentation on the Amplifier reliability standard, IEC 61290-8-1 by Diane Williams (Corning).

Status of FOTPs, and Projects

- Status of FOTP-130 (PN-2379) on laser diode life testing – Mike Musky, Lucent was unable to attend. The discussion was deferred until the next meeting.

- Status and discussion of EIA/TIA 610: Procedures for Calculating Optoelectronic Device Reliability

Pin Su reported that the document was reballoted and in June the comments were discussed, with changes agreed so that the log normal fitting algorithm treatment was expanded.

Jim Matthews noted that IEC 61751 – "Laser modules used for telecommunication – Reliability Assessment" existed. Action: JEM to obtain copy for discussion at next meeting.

All comments have been addressed. It was the opinion of the group that the document should be advanced. Pin to get blue card letters / certification from commenters, and request forwarding for publication. FO-2.6 will ask FO-2 to authorize publication on its behalf.

Review the mission statement (Scope)

The scope of FO 2.6 was reviewed. It was noted that the traditional long-term reliability approach might need to be revisited in light of current markets. Many products come to market and mature quicker than the classic approach requires. No specific changes were proposed for the scope of FO 2.6.

Discussion of Future Work and New Projects

There continues to be a need to facilitate entry of new technologies to the market. Key issues are limited temperature range for acceleration, shorter product life cycles, operating at higher temperatures, and increased risk by the customer / tolerance of failure. It was noted that the expectations for 40 year service life have changed to much shorter periods.

One member suggested the need to have a qualification document, a FIT estimation document, and a way to aggregate them into an overall limit. If IEC 61751 is not adequate, then industry may need a document like Telcordia GR-468.

One member noted there should be two types of documents:
1) How to handle a new product / technology
2) How to handle a module consisting of multiple components.
It was also proposed that a list of all devices which might be covered by FO 2.6

The committee agreed that reliability standards were needed for quasi-active components – components with changeable states or require power for activation / evolution. This could include switches as well as mems like technologies. (micro-electromechanical systems)

Another member noted that a guide indicating whether damp heat testing is a good indicator of field performance for long periods of times. For some technologies damp heat does note seem to be a useful predictor.

Action for FO 2:

Approve EIA/TIA 610 for TSSC/Publication pending receipt of blue cards.

8 FO-6 Subcommittee Chairman Reports

FO-6.1 Fiber Optic Test, Measurement and Inspection Instrumentation, by Dennis Horwitz

In-Process Projects

- (TSB-XXX) Fiber Optic Power Meters: Measurement and Application Issues Andre Girard/Marc Breton presented draft TSB. Members to submit comments directly to Andre by 8/30/00 for new draft review at January-2001 meeting.
- (TSB-XXX) Optical Return Loss Meters: Measurement and Application Issues Lorenz Cartiller i/Dennis Horwitz presented draft TSB. Members to submit comments to Lorenz by 8/30/00 for new draft review at January-2001 meeting.
- (TSB-XXX) Multifiber Connectors: Reference Cable Issues (tentative title) Teodor Cotrutra presented draft TSB. Members to submit comments by 8/30/00 for new draft review at January-2001 meeting.
- (TSB-XXX) Polarization Dependent Loss Meters: Measurement and Application Issues. Rex Craig presented draft TSB. Members to submit comments by 8/30/00 for new draft review at January-2001 meeting.

New Projects

(TIA-XXX) Glass Geometry Calibration: FO-6.1.10 to request PN for adoption of IEC 61745 as TIA standard under FO-6.1.10.

- IEC XXXXX Paul Hale/NIST to lead group in developing draft IEC calibration document to be submitted to TC86 WG4. Draft expected for review by September-2000 for initial presentation at next IEC TC86 WG4 meeting on 9/25/00 in Boulder
- (TSB-XXX) Polarization Modal Dispersion Meters: Measurements and Application Issues. Andre Girard volunteered to develop and present a draft TSB at January –2001 meeting

Liaison Projects

- TSM-6: FOTP Author's Guide (plus OFSTP & ITM Author's Guides) Contact Steve Swanson/Stephanie Montgomery regarding status of proposed revision of FOTP Author's Guide re previously developed calibration requirements. Also investigate status of OFSTP & ITM Author's Guide for same update
- NIST Optical Fiber Measurement Conference is to be held in Boulder-CO on September 26-28, 2000. IEC TC86 WG4 will hold meeting in conjunction with NIST OFMC on Monday, September 25, 2000.

FO-6.3 Fiber Optic Interconnecting Devices and Passive Products, by Tom Ball

The subcommittee has made significant progress in updating its document list. More than 18 action items on FOTP, IS, Spec and FOCIS open issues were completed and dealt with. A number of documents were published.

FO-6.3 approved a motion to ask FO-6 for interest in determining the process registration of detailed specifications.

Two presentations were given in FO-6.3:

- RIFOCS on Generic Workmanship Guidelines for Optical Intermateability
- Ocean Design on Developing an International Telecommunication Standard for Wet-mateable Subsea Fiber Optic Connectors.

FO-6.3 also approved the formation of a task force to address harmonization process between TIA and IEC.

FO-6.6 Optical Fiber, by Greg Smith

Decisions:

- John Richter was recommended as new chair of FO-6.6.10, replacing Hailong Zhong. This was confirmed.
- Agreed to advance IEC chromatic dispersion document text as a TIA document. (adoption)

New Projects

- FO-6.6.1 will review scope and possibly compose new scope. Clarification of various issues was discussed.

Ballots in Progress

- SP-4590 492CAAB James Refi of Lucent Technologies reported that responses to for the Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak are due July 17. Of most concern is the hydrogen aging test, where the TIA and IEC differs slightly in the prescribed wavelengths

Action was authorized on the following documents:

Document Designation	PN/SP	Author	Title	Status
455-3A	PN-3409	Kapron	Temperature Cycling Ballot	new document
455-47B	SP-2834	Hailing Zhong	Far-Field Radiation Pattern	Reaffirmation ballot authorization
455-44B	SP-2833	Dave Krittler	Refr. Ind. Profile - Refracted Ray	Reaffirmation ballot authorization
455-62A	SP-2369	Kapron	Macrobend Attenuation	Reaffirmation ballot authorization
455-74	SP-2818	P.Neveux	Fluid Immersion - Opt. Prop	Reaffirmation ballot authorization
455-75A	SP-2134 see PN-2140	P. Neveux	Fluid Immersion Test - Opt. Fibers	Reaffirmation ballot authorization
455-67	SP-2819-A	Franz	High Temp. Exposure on Opt. Char.	Reaffirmation ballot authorization
455-70	SP-1576-A	Franz	High Temp. Exposure on Mech.Char.	Reaffirmation ballot authorization
455-160	SP-2821-A	Franz	Temp./Humidity - Optical Char.	Reaffirmation ballot authorization
455-161	SP-2822-A	Franz	Temp./Humidity - Mechanical Char.	Reaffirmation ballot authorization

455-30B	SP-4189	Hailing Zhong	Freq. Domain Meas. (MMF)	Rescission (Withdrawal) ballot authorization
455-76	SP-4218	Kapron	Dynamic Fatigue	Rescission (Withdrawal) ballot authorization
455-122	SP-3327	P. Hernday	Polarization-Mode Dispersion Measurement for Single-Mode Optical Fibers by Stokes Parameter Evaluation	Letter (PN) Ballot Authorization

Presentations:

- Mike Hackert gave an update from FO-2.2.1 on Launch Conditions and the current status of FOTP-203 and FOTP-204.

Schedule change requests

FO-6.6.8 requests, if possible, to be moved to the Wednesday AM time slot.

FO-6.7 Fiber Optic Cable, by Mike Kinard

New Projects

No really new projects, but there were two new PN requests authorized to begin reaffirmation.

Ballots Authorized

FOTP-25, impact; SP arising from the Letter Ballot.

FOTP-82, fluid penetration; SP to continue revision.

FOTP-xxx, ribbon separability; Letter Ballot of initial draft.

TIA-4720000, Cable Generic; rescind in favor of a herd of Sectionals.

TIA-472D000, OSP Sectional; revise existing document by adopting ICEA S 640.

Rolf Frantz assumed authorship of those documents that Casey Wieczorek had been authoring that had not already been reassigned. Several new authors will be assigned by member companies. No assignments by the Mandatory Author Draft (MAD) process were necessary.

TSSC Review Authorized

TIA-598, color coding (redundant to last time).

FOTP-99, gas flame; to rescind.

FOTP-104, cyclic flex; to reaffirm.

FOTP-183, hydrogen; new document.

Presentations Given

ITU/IEC PMD & L-band Status, Bill Gardner. Nothing new to report on PMD. The L-band debate on a reasonable upper limit on the band seems to be hardening on 1625 nm as the upper end. In ITU, 0.4 dB/km for each cable (normative), and 0.35 dB/km for links (nominal) have been determined for this band.

Future Presentations

PMD & L-band International Status, Bill Gardner

FO-6.9 will propose Blue for PM/PZ, rather than Light Blue.

Task Group Reports

FO-6.7.1/11/12, Specifications. Rolf Frantz will chair the TG, replacing Casey Wieczorek. ICEA S640, the OSP cable standard, will be published any day. The associated MOU is said to be in the hands of TIA Staff. Closure of the MOU is anticipated. S596, Premises cable, and S696, Indoor/Outdoor cable, are moving; publication is anticipate in Spring 2001. Adoption of these are expected, using S640 as a model.

Motion to adopt ICEA S640 to replace TIA-472D000 passed. The Chairs of 6.7.1 and 6.7 are authorized to work out whatever details.

FO-6.7.10, Color Code Standard. Rolf Frantz will chair the TG, replacing Casey Wieczorek. This revision of TIA-598 is ready for publication. Future issues will be the definition of Gray and the use of Blue for PM/PZ jackets.

FO-6.7.14, Hydrogen test; FOTP-183. Rolf Frantz will chair the TG, replacing Casey Wieczorek. Nathan Hatch had already assumed authorship of the FOTP. It, too, is ready to publish.

FO-6.7.15, IEC coordination. Jack Rosko presented his report.

FO-6.7.16, Ribbon issues. Kinard reported for Jon Fitz. Dimensions measurement round robin is moving, though slowly. A draft of the Ribbon Separation FOTP is promised before January. Editorial work on FOTP-131, residual twist, is being done for Global.

FO-6.7.17, Cable impact test, FOTP-25.John Smith presented his report. The FOTP is ready for SP ballot.

Other Discussion

Harmonization of IEC and TIA documents was discussed. It was noted that the US delegation has been quite successful in getting US positions into IEC documents, but harmonization in the other direction is very slow. This will become an ever more-important issue in the near future.

There have been problems with some members getting ballots, announcements, etc. It is felt that both the reflector and the data base needs updating.

FO-6.9, Polarization Maintaining Fibers, Connectors and Components by Rex Craig (Formerly Subcommittee on Sensors)
Secretary: Dennis Horwitz, RIFOCS Corp.

In-Process

- PM Connector Insertion Loss (FOTP-200) SP-4245 Currently an open SP Ballot, expires July-2000. Subcommittee authorizes the author to reconcile any comments and go to SP Default Ballot/TSSC if technical comments need to be resolved or directly to TSSC if only editorial comments.

- PM Connector Return Loss (FOTP-201) SP-4246Currently an open SP Ballot, expires July-2000. Subcommittee authorizes the author to reconcile any comments and go to SP Default Ballot/TSSC if technical comments need to be resolved or directly to TSSC if only editorial comments.
- TSB-PM Fiber in Telecommunications-Applications and Issues (TSB-120) PN-4252. Will reconcile comments from previous PN ballot and forward to TSSC.
- In-line Polarization Crosstalk Measurement Method (FOTP-199) PN-3783 Author to reconcile internal comments and authorized to submit directly for SP Ballot.
- Generic Spec for PM Connectorized Assemblies PN-tbd Greg Ronan developing updated draft for final review at January –2001 meeting. Then forward to SP ballot at that time.

LIASON ACTIVITIES

- Optical Cable Color Coding TIA/EIA-598-B. TIA-598B released without PM requirements. FO6.9 has submitted request to include PM Jacket Color Code of EIA Blue in Revision C.
- FOCIS Generic TIA/EIA-604-C SP ballot closed with non-PM comments to be addressed. Includes PM applications.
- SC Connector FOCIS-3A SP ballot open. Includes PM orientation requirements
- FC Connector FOCIS-4A SP Default Ballot closed and includes PM orientation requirements. Members of FO6.9 questioned the text describing the k=2-3-4 key options. Issues were raised at FO6.3 meeting and resolved to satisfaction.
- MTP/MPO Connector FOCIS-5 PN requested to develop revision A to include dual row configuration for n=12, 18 and 24. Ronan/Horwitz to develop input on PM orientation and submit to Joe Graham/US CONEC.
- LC Connector FOCIS-10A SP ballot open. Includes PM orientation requirements.
- LX.5 Connector FOCIS-13 SP ballot closed. Includes PM orientation requirements

9 Liaison Reports

Note: Most liaison reports from other SDOs are given in multiple working groups or subcommittees. To enable easier access to them, the liaison reports have been extracted from individual reports and consolidated

DoD report, by Art Hudson:

Twenty-one draft FOTP TIA Test Methods documents are in the process of being reviewed since the last TIA meeting in January. Comments have been submitted to the authors of 20 others. Dave Leight can provide a list of these documents.

Changes to MIL-SPEC document status include:

TIA-2/6. The TIA/EIA-440 Terminology document has had no progress. The document needs response letters to commentors before a final draft is prepared. Numerous e-mails and faxes to TIA requesting copies of outstanding comments and an electronic copy of the document have been unanswered. Perhaps the e-mails are not reaching TIA, as a return receipt is never received. Dave Leight will try to resolve the problem and respond to commentors before the next TIA meeting. TIA subcommittees and working groups are reminded to prepare new terms and definitions for the next revision of TIA-440. The military services have reviewed the various military standards' terms and definitions, and will provide these as a draft for revision C of TIA-440.

TIA-FO-6. There are still issues about who can write a detail spec and how a TIA registration system would work. We really need the ability for users (DoD and DoD contractors) to write detail specifications, if your subcommittees are not going to write them.

TIA-FO-6.3. Fiber Optic Multi-channel circular connector MIL-C-28876 and all specification sheets initial drafts have been prepared and should be available for comments by August 2000. TIA/EIA-604 and 5 of the FOCIS documents are under review by DoD.
The Fiber Optic Switch specification MIL-S-24725 and associated specification sheets are now in process of being canceled.
Fiber Optic Termini MIL-T-29504 and associated specification sheets initial drafts have been mailed for review. These documents are available for viewing and downloading on the DSCC home page.

TIA-FO-6.6. MIL-PRF-49291/6C and /7C drafts are still being held by the Navy awaiting dating. Cable harness specification MIL-H-24626 was cancelled in February.

TIA-FO-6.7.Revision A to MIL-DTL-85045/8 is in process and the Navy is working on new specification sheets /25, /26 and /27. MIL-C-85045/13 through /20 are under revision. Work is continuing on FOTP-88 for reinstatement.

TIA-FO-2.3. MIL-T-27735, light wave Transmitters, MIL-C-24733, Controller Interface Unit, and MIL-R-24737, light wave receivers and their associated specification sheets were cancelled in February.

IEC 86A TAG report by Tom Hanson:

WG1
The following summarizes the key events of the April 2000 meeting:
- Completed a page review of the proposed restructured and revised fibre specifications [60793-2] and agreed to advance the new documents as a ballot. In this discussion the following key items were agreed:
  - Create a new sub-category of unshifted single-mode fibre, B1.3 [G.652], to support transmission on portions of the wavelength range: 1360 nm to 1480 nm.
  - This new sub-category requires a hydrogen sensitivity test, which was agreed upon - with reservations from some delegates.
  - Modify the dispersion limits of B4 [G.655] fibre.
- Completed a page review of 86A/563/CDV, the ballot amending 60793-2, WG comments will be submitted as National Committee comments
- Advance a nuclear radiation guideline and test method as ballots.
- Activate a new Task Group on upgrading category A1 fiber for Gigabit Ethernet
- Revise the multimode bandwidth document to support laser launch (next meeting)
- Transfer the PMD test method from being a Technical Report to a full test method (next meeting)

WG3
The WG was updated on the following items which have been moved into the next ballot phase:
- Guideline on calibration
- Test for underwater cable resistance to hydrostatic pressure
- Test for resistance to shotgun damage
- Aeolian vibration test
- Cable coiling performance test
- Edition 3 of 60794-3, Sectional specification for outdoor cables. This features, among other items:
  - Updated attenuation specification values

- A statistical specification on polarization mode dispersion (PMD)
- A guideline annex on the calculation of PMD statistics
- A guideline on hydrogen

The following additional work was advanced to CDV stage:
NWIP for Simplex and Duplex Internal Cables
NWIP for Multifiber Distribution Cables
NWIP for a family Specification for Duct and Buried Cables
NWIP for a family Specification for Self Supporting Aerial Cables
NWIP for a family Specification for Lakes and River Crossing Cables
NWIP for a family Specification for Indoor Cable Optical Fibre Ribbon Cords

Work will continue on Air blown installations by an Ad Hoc group focusing on patent issues.

IEC 86B TAG, by Tom Ball

IEC SC86B circulated 37 standards under development for vote/comment from January- May, 2000.

- WG 4 Test Procedures-(15)

  1309/NP, Transient Loss
  1325/FDIS, Screen Testing of Attenuation of SM, Tuned Angled Connectors
  1338/NP, End Face Geometry Measurement of Multi-fibre Connectors
  1339/DC, Maintenance Program for 2000
  1340/MCR, Vibration (Sinusoidal)
  1341/MCR, Torsion/Twist Test
  1342/MCR, Dry Heat
  1343?MCR, Damp Heat
  1344/MCR, Climatic Sequence
  1345/MCR, Eccentricity of a Convex Polished Ferrule End Face
  1346/MCR, End Face Radius of Spherically Polished Ferrules
  1347/MCR, Impact
  1350/CD, Attenuation of Random mated Connectors
  1362/NP, Coupled Power Ratio Measurement for FO Sources
  1363/CD, Transient Loss Measurement

- WG6 Interconnecting Devices and Hardware (12)

  1306/CD, Interface Standard for the Type SG Connector
  1308/NP, Detail Specification for Splice Organizers
  1310/CD, Generic for Enclosures
  1314/FDIS, FO Connectors Terminated to SM Fibre for Category U, Uncontrolled Environment
  1318/FDIS, Interface Std for the Type Mini-MPO Connector
  1319/NP, FO Interfaces, Addition to 61754-4-2, Simplified SC Receptacle Interface
  1320/NP, FO Interfaces, Addition to 61754-6-2, Simplified MU Receptacle Interface
  1323/CD, Performance Standard for FO Connectors on MM Fibre for Category C-Controlled Environment
  1324/FDIS, Amendment to the Interface Std for the MPO Connector, Addition of Back Plane Interface
  1336/FDIS, Performance std – Part 1, General and Guidance

1351/CD, Performance Std for FO Connectors on SM Fibre for Category C-Controlled Environment
1352/CD, Interface Std for the LC Connector

- WG7 Passive Components (10)

1312/CDV, Performance Std. for Non-Connectorized SM 1XN & 2XN Non-Wavelength Selective Branching Devices for category U, Uncontrolled Environment
1313/CDV, Directivity of FO Branching Devices
1316/CD, Performance Standard for SM Non-Connectorized DWDM Devices for Category C-Controlled Environments
1317/NP, Performance Standard for Non-connectorized SM, 1xN, Spatial Switches for Category O, Outside Plant
1321/CD, Performance Standard for SM FO Pigtailed Circulators for Category U-Uncontrolled Environment
1322/CD, Performance Standard for SM FO Pigtailed Isolators for Category U-Uncontrolled Environment
1337/FDIS, Generic for Passive Dispersion Compensators
1355/CDV, Performance Std for SM Fibre Plug Fixed Attenuators for Category U-Uncontrolled Environment
1356/CDV, Performance Std for SM Fibre Pigtailed Fixed Attenuators for Category U-Uncontrolled Environment
1361/FDIS, Generic Specification for Non-wavelength Selective Branching Devices

Next Plenary & WG Meetings:

♦ Plenary & WG: September 11 – 19, Stockholm, Sweden

IEC TC86C by Diane Williams

IEC TC 86C/WG3 March meeting on Optical Amplifiers

Diane Williams of Corning gave a summary:

- Last meeting was held in Baltimore in March
  - 20 attendees from 14 companies were present
  - Companies present: Agilent, Alcatel, Alcatel Optronics, Corning, CSELT, EXFO, Furukawa Electric, NEC, NIST, Nortel, NTT, OCLI, Pirelli, and Thomson-CSF
- Next meeting: September in Stockholm
- Significant progress made on OA reliability standard - CDV stage is next
- Agreement reached to initiate NWIP for draft OA performance (qualification) standard
- Discussion began on criteria and selection of RTM for OA measurements
- Significant progress made on draft technical report on OA classification - NWIP will be initiated
  - Key contents: OA family tree, OA abbreviations, OA operating bands, EDFAs, non-Er doped fibre amplifiers, fibre Raman amps, SOAs, and planar waveguide doped amps
- EXFO requested their Poincare Sphere technique be added to PMD NWIP draft standard for Oas
-

ITU-T By Felix Kapron

ITU-T SG-15/WP-4 April meetings on Qs.16&17.

Felix Kapron presented a summary of the April meeting on Q.16:

- Study Group 15: *Transport Networks, Systems and Equipment*
  (Chair: Nortel; Canada)
  - Working Party 4: *Transmission* (Telecom Italia; Italy)
    - Question 16/15: *Characteristics of optical systems for terrestrial transport networks* (Lucent; US → Tyco; US)

The WP contributes to the G-Series of Recommendations on
Transmission Systems and Media, Digital Systems, and Networks

This was the last plenary meeting of the 1997-2000 Study Period.
There were up to 33 persons from 22 companies and 9 countries, with about 60 contributions.

Accomplishments

- Determined text of the Question for the next SP
- Rearranged editors for some Recommendations. G.955, G.957 (Ciena; US)
- Finalized the text for G.691, *Optical interfaces for single channel STM-64, STM-256 systems and other SDH systems with optical amplifiers*. (Ericsson; Sweden)
  - applies to single-wavelength systems, with some consideration of future 40 Gb/s systems
  - gives "application codes" for classification of optical interfaces
  - target distances are about 20, 40, 80, 120, 160 km
  - wavelengths/fibers are 1310 nm on G.652, 1550 nm on G.652, G.653, G.654, G.655
  - gives parameter definitions and some measurement methods
- Almost completed G.959.1, *Optical transport network physical layer interfaces*, to be finalized at an Expert Meeting in September 2000. (Corning; US → Nortel; UK)
  - gives parameter values for Tx, optical path, Rx interfaces between carriers
    - there are difficulties in measuring signal parameters since the interface points may be multichannel, but the individual single-channel signals are inside unspecifiable black-boxes
  - true optical networking (add-drop multiplexing, routing, wavelength-translation, …) will be worked in the next SP
- Will start a new G.dsn, *Optical system design and engineering considerations*.
  (Corning; US)
  Potential sections are:
    - Spectral bands (S-band, C-band, L-band, etc.), which are to be decided in September for an ITU Press Release
    - Wavelength ranges determined by attenuation and dispersion, and their compensation by optical amplifiers and dispersion compensators (including PMD)
    - Operating wavelengths for DWDM systems (to include nonlinearities)
    - Cascading sections - worst-case design, statistical design, comparisons & trade-offs
    - Forward error correction
    - Upgradability
    - Transverse & longitudinal compatibility
    - Transparent optical network elements (Mux, Dmux, OADM, OXC, …)
    - etc.: topology, optical channel transportation, optical label switching, …

Jim Matthews noted that Question 17/15 approved Recommendation G.663 on amplifiers, and determined G.671 on optical components. For G.671, open issues include PMD values for dispersion compensators, and an Appendix on 2 dimensional matrices for optical DWDM devices.

One participant noted that some European carriers are looking at optical channel overhead by an all optical approach: modulation of signal with overhead. A call was made to provide inputs on what are the limiting factors for an optical signal to carry overhead. Specifically small index amplitude modulation through amplifier chains or cross connects – what techniques are available inside an optical layer rather than an electrical wrapper. European limit was believed to be 64 kbit. For inter-office applications, there is a need for a transparent format. Digital wrapper forces regeneration – also what happens when all optical regeneration is available? Call is made for US Study of max. BW, data rates and distances. Specifically: Information from the vendor community on trade off studies of various implementations of OC1, OC3 and 100 M Ethernet OSCs with 40/80/120 km. spans, using different transmitter and receiver technologies. Specifically, relative cost and gain margin calculation

ITU-T Documents for Advancement

FO-2.1.1 reviewed and discussed 9 contributions, which are destined for presentation to ITU-T SG15 Experts meeting in September of 2000. No formal action was taken on these documents since contributions to experts meetings are open. However, the value of discussion was enormous, since it represented a chance for the authors to seek early inputs, and support for their position.

- TD3 from Worldcomm on an upper limit for the "L" band was broadly agreed, and at least 4 other organizations signed on as co-authors to broaden its support.
- TD10 from Ciena on possible directions for the work on Recommendations G.955, G.957 and G.691 was discussed and reached general agreement as well.
- TD04 from Worldcomm was agreed highlighting an open issue of concern with limited progress to date in G.959.1 on the structure and content of the OSC
- Three documents: TD-08 from Telcordia on Single Channel Parameter Measurement Methods in G.959.1, TD09 from Telcordia on "Single Channel Reference Point Notation in G.959.1" and TD14 from Nortel Networks proposing a support of ITU defining Parallel Optics Interfaces for Short Reach Applications will all be reworked taking into account technical, editorial and political concerns in the international arena and be recirculated to the group by the e-mail exploder prior to going forward to ITU-T.
- TD12 (Rev 2) Nortel Networks contribution on "STM-16 Application code for the next revision of G.692." Proposes to add 2 application codes and provides two tables of parameter values for illustrative purposes. It was agreed to send this document forward for the ITU-T experts consideration.
- TD13 Nortel Networks contribution on "STM-64 Application code for the next revision of G.692." Proposes 2 STM 64 Application Codes. This document was also agreed for ITU-T Experts considerations.
- TD-11 was provided by the editor of G.dsn, to provide discussion in FO 211 for possible band ranges. Based on input from the group, the proposal will be modified, and clarified to note the outer limits of the transmission bands are fixed, but the dividing points between the bands is relatively fuzzy - for classification purposes not specification purposes.

IEEE 802.3 Liaison Report

- The 10 Gigabit Ethernet work is progressing. An official task force has been set up in the IEEE. Various PMD options are being discussed and contrasted. At present there are approximately 20 proposals being considered. Down select to seven proposals will occur in July. It is expected that the standard will not contain all seven of the solutions identified during the July down select. Discussions are occurring within the task force as to how many solutions the new standard should address. Some members support documenting 3 solutions in the final standard while other

members support documenting 5 solutions in the final standard. If agreement cannot be reached by the task force membership, a deadlock may develop which will stop the standard from progressing.

- New IEC eye safety standards are in the final stages of approval. Part 2 of the standard has been approved and Part 1 of the standard is in the final ballot stage. These new standards are extremely important to the IEEE task force as the new safety standards will allow higher optical powers at 850 nm for Class I devices. The change in requirements will allow 850 nm optical sources to have output optical powers approximately 2.5 dB higher than allowed under the current standards.

- High Performance Parallel Interface – 6400 Mbit/sec Optical Specification

  A draft copy of the "High Performance Parallel Interface – 6400 Mbit/sec Optical Specification" was brought before the subcommittee. Several areas of the document are of interest to the subcommittee. These areas include the optical power budget, optical source and multimode fiber bandwidth specifications, and cable skew requirements and test procedures.

The optical fiber cable group met informally, as their new work is not yet officially authorized. Work on the ADSS spec., P1222 is beginning, as is discussion of a Wrapped Cable document. All anticipate official IEEE authorization by the next meeting.

ICEA update.

Specifications on OSP cable, Premises cable, and Outdoor/Indoor cable are discussed above. TWCS-TAC work on cable jacket weathering is ongoing. The initial report is expected in December, with a project timeline determined at that time. The issue is testing of new jacket formulations and acceleration of the test times. There was discussion.

10 New Business

The next meetings will be held:

January 8-11, 2001: Palm Springs, California

Spa Hotel
100 N. Indian Canyon Drive
Palm Springs, CA 92262
Room Rate: $139.00

Phone: (760) 325-1461
1-800-854-1274
Fax: (760) 325-3344
Cut-off Date: December 13, 2000

June 2001: Portland, Maine

January 2002: Kauai, Hawaii

June 2002: Bermuda (Lake Tahoe – secondary choice)

11 Adjournment

The meeting was adjourned at 5:09 P.M. on January 27, 2000. The meeting was conducted in accordance with the legal guidelines as stated in the TIA Engineering Manual.

Respectfully submitted,

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Attachment: Action List

1. Attendance Roster sheets need to be updated. Several chairs were not listed on their meeting attendance sheet. Continuing Action
2. Continue assigning meeting rooms according to attendance. - Larger group - Bigger Room; Smaller group - smaller room. FO-6.1 and 6.1.10 need bigger.
3. Remove FO-2.4 and FO-2.5 from various lists as both sub-committees have been disbanded.
4. Make proposal to TIA administration to consolidated all terminology documents into one document. Frank Stein was suggested as a possible document author. Financing would be TIA responsibility. Stephanie will investigate whether plausible.
5. Gair Brown should have further communication with TIA regarding registration feasibility and legality.
6. A proposal to have a liaison to OIF was presented. Corning and Lucent volunteered. Corning will draft a letter to OIF (Optical Inter-networking Forum) and Lucent will edit. A status report will be given at the next meeting.
7. FO-6.3 will take into advisement forming a new working group on submarine connectors following a presentation by Ocean Design. Decision to be made at the sub-committee level.

Approved by General Counsel

FO-2, FO-6 Meeting Report
Date: 06/16/00
Location: Quebec, Canada

Approved: 11/03/00
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