SPECIAL COLLOQUIUM
ON
THE FUTURE OF THE UTC TIME SCALE

28-30 May 2003

Istituto Elettrotecnico Nazionale "Galileo Ferraris"

Conference Hall

Strada delle Cacce, 91

Torino, (Italy)

COLLOQUIUM ON UTC

Purpose:

- Review Areas Relevant to Issues
  - Astronomical Background
  - ITU-R Background
  - Considerations for International Timekeeping
  - Navigation Systems Issues
  - Earth Rotation Issues
  - Telecommunications Issues
    - Opportunity for Contributed papers
- Presentation of SRG Results and Working Recommendation(s) –
- Opportunity for Roundtable discussion
- Summarize Results for Inclusion in Report to ITU-R

ISSUES RAISED TO ITU-R

Creation and Maintenance of UTC is Responsibility of ITU-R

Question Raised Concerning Need For Continuous Timescale Of Use In Satellite And Telecommunications Systems

- Proliferation of Independent Timescales (such as GPS Time)
- Modified UTC or TAI
- UTC Leap Second Issue

Changes proposed to UTC Timescale

ITU-R WP 7A Adopted New Question to Study the Issues

- Question ITU-R 236/7, The Future of The UTC Time Scale
- Coordination with ITU Sector Members, IAU, URSI and CCTF

FUTURE OF THE UTC TIMESCALE

Question ITU-R 236/7 (2001)

Focus Studies into the areas of:

1. What are the requirements for globally-accepted time scales for use both in navigation and telecommunications systems, and for civil time-keeping?

2. What are the present and future requirements for the tolerance limit between UTC and UT1?

3. Does the current leap second procedure satisfy user needs, or should an alternative procedure be developed?

SPECIAL RAPPORTEUR GROUP

Established to focus studies into this highly significant question

- **UTC to Combine Atomic Time (TAI) and UT1 Adjusted by leap seconds Established by ITU-R Recommendation TF.460-5**
- **UTC has become the common international time scale replacing GMT and basis for Broadcast and "Real Time" timekeeping systems**

Address additional issues raised concerning Satellite Systems

- Independent system time (e.g. GPS Time)
- Use of TAI

Investigate proposed changes to UTC in coordination with ITU-R Sector Members and CCTF

Report results and possible new recommendations for consideration by ITU-R

ITU-R Working Party 7A
Special Rapporteur Working Group
Members

Ronald Beard (USA), Chairman
William Klepczynski (IAU), Secretary
Michel Brunet (France)
Jacques Azoubib (BIPM)
Yury Domnin (Russia)
Donald Hanson (USA)
Thomas Bartholomew (USA)
Francoise Baumont (France)

Special Representatives: Sigfriedo Leschiutta (CCTF)
Dennis McCarthy (IAU)
Daniel Gambis (IUGG - IERS)

ELEMENTS OF THE QUESTION

1. Requirement of Time Scale
   - Accuracy, Stability
   - Based on the SI Second
   - Uniformity, Accessibility and Reliability
   - Availability - Global?
   - Civil / National Timekeeping

2. |UT1 – UTC| Tolerance
   - Could a Greater Tolerance be Accommodated?

3. User Needs and Alternatives
   - Availability of Leap Second Information for Users
   - Alternatives Used (Establishing System Independent Time)
   - Relationship of Internal System Time to Time Scales

SRG ACTIVITIES

Coordination with Technical Societies and International Standards Groups

- IAU, URSI, IUGG, BIPM, IERS, & CCTF
- ITU-Telecommunications Study Groups

Seeking Information from Telecommunications and Navigation Sector Members and Groups on Needs and Required Characteristics

Colloquium on Issues to Aid Formulation of Recommendation(s)

- Detail and explain expected impact
- Examine details of changes

Report recommendation(s) to ITU-R WP7A

OPTIONS CONSIDERED

1.Maintain the Status Quo

- Use UTC as currently defined
- Actions required to address concerns of use

2. Modify $|UT1 - UTC| < 0.9$ s Tolerance

- Increase to larger value
- Establish Longer Prediction Interval and Frequency of Occurrence
- Establish Fixed Interval Adjustment with Multiple Leap Seconds
- Correction at Predicted Intervals Based on Deceleration Model, Re-evaluated at Fixed Intervals

3. Transition to Another Timescale

- International Atomic Time (TAI) - (Navigation Time Scale for Celestial Navigation may be needed)
- Establish Need for Time Scale Based on Re-Definition of SI Second?

SUMMARY TO DATE

- Information mostly gained from surveys
  - URSI, Japan, NIST, IERS
  - Little direct response with data from Sector Members & user groups
- Celestial navigation needs for |UT1 – UTC| appears significantly reduced
- Most apparent impact expressed concerned software investment and changes
- Transition to alternative timescale considered difficult
  - UTC tied to current telecommunication and civil infrastructure
  - Modification or change of generally available and used system would require substantial changes