Proposed RECOMMENDATION CCTF x (2015):

Development of national and international time and frequency links, to improve methods for intercontinental clock comparisons and for dissemination to stakeholders

The Consultative Committee for Time and Frequency (CCTF),

considering

• that optical frequency standards have demonstrated fractional uncertainties in the low 10^{-18} and that the reduction in the uncertainty and instability of optical frequency standards developed in institutes around the world will continue,

• that long distance comparison with optical fibre links is demonstrated with stability and uncertainty which is compatible with the best present and future optical frequency standards,

• the need for regular comparisons between these standards, as an essential part of the preparation for a redefinition of the second and for other applications such as contributions to time scales,

• that the stabilities of time and frequency transfer techniques currently and routinely used for comparisons around the world, i.e. for the production of International Atomic Time (TAI), are insufficient for comparisons between the best optical frequency standards,

• the growing interest of Earth science and geodesy scientific communities for chronometric geodesy, i.e. a new applications of optical frequency standards for determining gravitational potential differences and improving Earth gravity models and reference systems with these measurements,

• the growing needs of industry for improving time and frequency capabilities using better transfer methods, in particular in the telecommunication and aerospace sectors.

recommends that

• national metrology institutes (NMIs), optical fibre network providers, space agencies, national governments, regional metrology organizations (RMOs), the International Committee for Weights and Measures (CIPM), International Telecommunications Union (ITU) and other relevant bodies:

- Vigorously support research and development of time and frequency transfer techniques matching the stability and uncertainty of the most advanced frequency standards. These techniques may include optical fibre links, advanced satellite microwave links, optical space links and transportable frequency standards, and advanced space clocks.

- Help secure sustainable infrastructure of selected continental and intercontinental links forming a global time and frequency metrology backbone for these novel technologies.

- Make provision that these novel technologies are transferred with the relevant accuracy to other fields of science, industry and society.

• the BIPM participates actively in these developments, notably by making preparations for exploiting, in time scale realization, clock comparison data issued from new time and frequency transfer methods.