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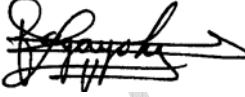
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REPORT

TO: **Mr. Oumarou Diakité**
Coordinator of the TOKTEN Project
University of Bamako, Bamako, Mali

THROUGH **Dr. Komakan Konaté**
Professor of Physics, Host of the
Consultant (D. Bagayoko)

FROM: Diola Bagayoko, Ph.D. 
SU System Distinguished Professor of Physics
Adjunct Professor of Science and Mathematics Education
Director, the Timbuktu Academy

DATE: **April 30, 2007**

SUBJECT: **Report of the TOKTEN Sponsored Mission of Diola Bagayoko, Ph.D., March 19-24, 2007**

I. Introduction

This document and the attachments to it constitute the report of the above identified TOKTEN sponsored mission of Pr. Diola Bagayoko, Ph.D., from March 19 to March 24, 2007. Following this introduction, this report first describes the activities conducted by the consultant (D. Bagayoko), with specifics on the dates, times, places, participants, and topics or tasks for said activities. This description will be in a chronological order. It is followed by a summary of key results from these activities. The last two sections deal with budget notes and a summary of recommendations, respectively. In this report, Rector refers to the President or Chancellor of the University, in American terminology. Hence, the Vice Rector is the Vice President. GLOBE stands for Global Learning and Observations to Benefit the Environment (www.globe.gov). This

international, environmental and earth science education and research program is fully described at the above web site.

II. Consultant's Activities, March 19-23, 2007

The table below provides the listing of most of the major activities undertaken by Bagayoko during the mission. It should be noted, however, that the work of the consultant on preparing or reviewing documents, preparing for the conference held on Thursday March 22, 2007, and for other tasks he carried out alone are not enumerated below. Hence, the table lists only the major activities that involved others, beginning with M. Siaka Sangaré. Given that the activities of the consultant have to be in line with the terms of reference for the mission, the reader is urged to see these terms in the second row of the table, in *Italics*.

Dates	Hours	Venues	Participants and Purposes
Monday March 19, 2007	10 AM -11:20 AM	TOKTEN Office	Bagayoko, Mr. Oumarou Diakit�, and TOKTEN Staff: Signing-in and review of the terms of reference for the mission: <i>(1) Research work with Mr. Siaka Sangar� and Dr. K. Konat� on the thesis of M. Sangar�; (2) Exchanges with the Office of the Rector of the University and her staff on the Topic of training the trainers, professional development, and the related costs and means of financing; (3) Exchanges with Faculty members in the Department of Physics on the initiation of a Master's Degree Program (DEA) in Theoretical Physics</i>
	11:30 AM – 12 Noon	Office of the Rector	Courtesy visit to meet the Rector, with M. Diakit�, and to determine a time for discussions on the training of trainers (faculty development).
	12:25 – 12:45 PM	Office of the Dean of Sciences	Courtesy visit to the Dean of the College of Sciences and Technologies, with the Chairman of the Department of Physics (Dr. A. B�), Dr. K. Konat�, M. Siaka Sangar�, and others.
	12:45-2:00 PM	Computational Laboratory in Physics	Research work session with M. Siaka Sangar�: organization of the thesis, discussion and determination of the titles and sequences of the chapters to be covered.
	2 PM – 4 PM	Office of the Rector	Attendants: Meeting of D. Bagayoko with the Rector, Dr. Ginette Bellegarde Siby, M. Oumarou Diakit�, Prof. Salime Sylla, Dr. Amadou Diallo (Vice Rector), and Dr.

			Daouda Diallo, Topics: Development and review of plans for the training and professional development of the faculty (i.e., trainers).
Tuesday March 20, 2007	10 AM – 12:15 PM	Computational Laboratory in Physics	Research work session with M. Siaka Sangaré Work done: reorganization, modification, and completion of Chapter 1 and 2 of the thesis. The first chapter is the introduction. The second one deals with fundamentals of physical geography that provide the basis for the validation and analysis of GLOBE data.
	12:20 PM – 1:05 PM	Laboratory of Applied Molecular Biology	Bagayoko and Dr. Ousmane Koïta and his many graduate students. Subjects: Dr. Bagayoko was offered a tour of this unique Laboratory; he met the researchers; and he received a briefing, from Dr. Koïta, on the current projects of the Laboratory and the related presentations and publications.
	3:00 PM – 6 PM	Department of Physics and Grand Hotel	Participants: Bagayoko, Dr. K. Konaté, M. Siaka Sangaré. Activity: Review and finalization of the draft article to be submitted for publication in the refereed Proceedings of the 2007 Conference of the Louisiana Academy of Sciences.
Wednesday March 21, 2007	9 AM – 12 Noon	Lobby of the Grand Hotel	Participants: Bagayoko and Sangaré Tasks: (1) Review of the new version of Chapters 1 and 2 and further delineation of the content of Chapter 3, the key chapter relative to the modeling and analysis of GLOBE data from schools around the world. (2) Online filling out of the application form for a 2007 space science workshop in Addis Abeba, for M. S. Sangaré.
	12 Noon – 1 PM	Restaurant of the Grand Hotel	Participants: The Rector (Dr. Ginette Bellegarde Siby), M. O. Diakité, Pr. S. Sylla, Dr. Amadou Diallo, and D. Bagayoko. The Rector kindly paid for lunch. Topics: Continuation of the discussions on the training and professional development

			of Faculty members and related issues.
	2::30 PM – 4:00 PM	Office of the Department of Physics	Participants: the chairman of the Department (Dr. A. Bâ) and several faculty members [Pr. A. S. Maïga, Pr. K. Konaté, Dr. B. Z. Maïga, Dr. P. Dembelé, Dr. S. D. Traoré, D. Bagayoko, and M. Siaka Sangaré]. Topics: Establishment of the MS degree Program in Theoretical Physics (DEA in Theoretical Physics) – (a) Identification of Courses; (b) Determination of the needs for Professional Development for the Faculty; (c) Acquisition de reference materials (books, journals, etc.), including electronic sources; and (d) Related matters, i.e., submission of a plan to the administration.
	5 PM to 8 PM	Business Center and Lobby of Grand Hotel	Participants: Bagayoko and Sangaré. Tasks: Continued discussions of the thesis work, with emphasis on Chapters 3 and 4 and follow-up to the application for the 2007 space science workshop application.
Thursday March 22, 2007	Auditorium 1, College of Sciences and Technologies	9 AM – 11:30 AM	Conference Presentation by Diola Bagayoko on the subject of “<i>Studying in the United States of America AFTER the BS (Maîtrise) Degree.</i>” The audience was mainly the DEA and 4th year students, along with several faculty members.
	Lobby of the Grand Hotel	4 PM – 8 PM	Participants: D. Bagayoko and M. Siaka Sangaré Tasks: review and discussions of temperature data to be included in the modeling work to present in Chapter 3 of the thesis.
Friday March 23, 2007	Lobby and Business Center of the Grand Hotel	9:00 AM to 2:00 PM And 5:00 PM to 7:00 PM	Participants: Bagayoko and Sangaré Tasks: Analysis of data,; Continued discussions of fitted Temperature data and resulting graphs to be included in the two publications to be submitted; Discussions of other fittings to be considered (i.e., soil and water temperature data, rains fall, etc.) from the National Meteorological Services of Mali. Follow-up to the space science workshop application, including the sending of photos of the prospective location of the equipment on the roof of the

			Building facing the Office of the Department of Physics.
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On Friday, from 3:50 PM to 4:50 PM, Bagayoko called a meeting with M. Oumarou Diakité, Pr. Salime Sylla, and Pr. Amidou Doucouré to express the needs, for all three officials working in the Rectorat, to (a) work together by distributing responsibilities and by (b) always remembering to share the credits. Pursuant to the designation of Pr. Sylla to take on functions of an Office of Sponsored Programs at the Rectorat, Bagayoko stated that his work will always have overlaps and synergy with those of TOKTEN and the work of Pr. Doucouré as it pertains to external affairs. He noted that some organizations suffer from their success by forgetting to share credits when positive results are obtained. He stated his solid conviction that such very positive results are indeed on the way at the University of Bamako.

III. Summary of Results of the Mission

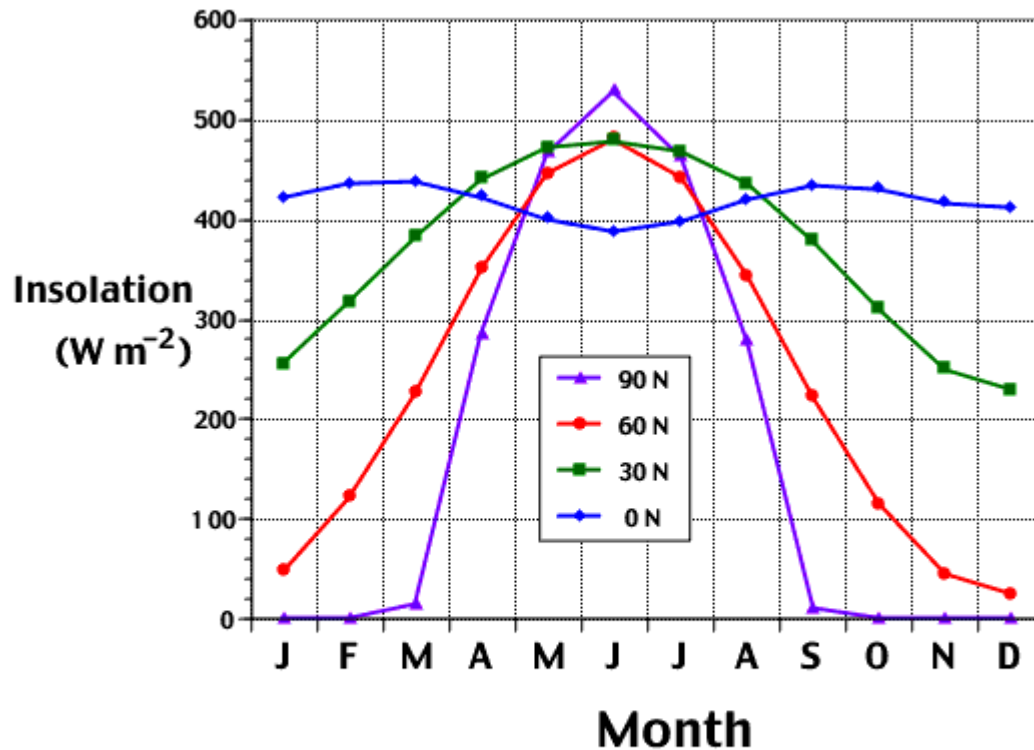
III.a Results Related to the Thesis Research

The thesis research of M. Siaka Sangaré was basically completed during our work sessions. Average air temperature data from more than 40 schools, for 2 to five years, have been fitted to a general sine function with the GraphPad software of PRISM. Additionally, fits were made to a few soil and surface water temperatures as well as rain fall data of the National Meteorological Services of Mali. We should note here that even though M. Sangaré and the consultant are the ones mostly listed in the Table of Activities, our results and analysis were always submitted to Pr. K. Konaté who took a great deal of time to review them as a part of his role of Co-Director of the thesis work of M. Sangaré. As in the case for the consultant, these individual efforts by Pr. Konaté are not reported in the Table. Hence, the following results are those of M. Sangaré with the assistance of the consultant and of Pr. Komakan Konaté.

Most of these fits were made before the mission. The role of the work during the mission was to determine the protocol for the control of variables to arrive at a unique determination of effects that can be compared to well-established concepts and laws of physical geography. For illustration, we note the fact that three parameters, at a minimum, have to be controlled. They are the latitude, the altitude, and the local environment. Given the decrease of insolation when the latitude increases, and the decrease of tropospheric temperature when the altitude increases, the effects of the latitude and altitude are easily understood. The effect of local environment requires some explanations. Indeed, the variations of the daily average temperature of air depend strongly on the site of the measurement. At comparable latitude and altitude, the local environment can make a significant difference. This difference is best understood by comparing the cases of different schools located in a desert, a savanna, a rains forest, and on the banks of large body of water. Due to the very large specific heat of water (i.e., the amount of energy require to change the temperature of 1 kg of water by one degree Celsius), large bodies of water (lakes, large rivers, seas, and oceans) act to moderate temperature variations. The graph below, from Physical Geography, shows the variation of insolation with the latitude.

The analysis of the fits noted above, after controlling for the three variables identified, led to the following findings:

- (a) In accordance with the variation of insolation with latitude, We found that a general sine function fits very well the average daily air temperature data. This is the first time that the use of such a fit is justified based on the insolation curve given below.
- (b) GLOBE data reproduced the decrease of the average daily air temperatures as the latitude increases.



Source of the Diagram above: Physical Geography, by Dr. Michael Pidwirny, University of British Columbia Okanagan (www.physicalgeography.net), Canada.

- (c) A detailed analysis shows that this decrease of the temperature is not uniform, as it is influenced by the local environment as defined above.
- (d) GLOBE data reproduced the decrease of the average daily air temperatures with an increase in altitude. Again, this decrease was found to be non-uniform, as expected from a detailed analysis.
- (e) The great values of the GLOBE data and of the four-parameter fit extensively utilized in this work were demonstrated by retroactively identifying El-Niño phenomena on the East coast of the United States, in 1998 and in 2002, through GLOBE data of schools in Massachusetts and in Pennsylvania. We are aware of no previous report of these phenomena deduced from GLOBE data. This finding underscores the critical value of the four-parameter fit for long term climate studies.
- (f) The four-parameter sine curve was shown to fit the soil and surface air temperatures

as well. Of course, the parameters of air temperature are different from those for soil and for surface water temperature. However, very subtle and long term climate studies can be conducted with comparison of these three fits at the same location.

The extensive tables and graphs resulting from the work are already included in the thesis, i.e., Chapter 3 that is devoted to fits and analyses. While we will not discuss it at length in this report, we should note that the non-linearity of the fundamental, differential equations describing the coupled air and ocean-circulations, among others, give the physical value of the work done here. Indeed, a consequence of the non-linear character of these coupled, differential equations is that tiny variations in the initial conditions can lead to huge variations in the resulting solutions of the differential equations. A clear consequence of this fact is that there is no substitute, in matters of weather and climate (long term, i.e., years) research, for accurate temperature and other data at as many sites as possible. This work therefore shows that the GLOBE data can play a significant role in weather and climate studies around the world. This fact is further supported by the reality that Satellite collected temperature data do not correctly describe the reality at ground level.

In addition to the scientific and technical content of the thesis, our work sessions also finalized its overall format. As noted in the Table of Activities, Chapters 1 and 2 were finalized while the contents of the remaining chapters were identified. What is currently left in this thesis work is therefore (a) the writing of Chapters 3-5 and (b) continuing refinement of analysis, with emphasis on practical applications of fitted GLOBE data in rural and other communities – for guiding agricultural activities and for informing public health actions as will be shown in the final version. If M. Siaka Sangaré completes the draft of Chapter 3 before the end of the summer, then his defense could be scheduled for fall 2007. This is particularly so in light of the fact that no less than two refereed publications are expected to be made by that time (i.e., the receipt of acceptance letters for the publications, even if the journals appear later).

III.b Outcomes of Consultations with the Rectorat

A very gratifying aspect of this mission has been the availability and visible eagerness of the Rector to discuss with the consultant issues of great importance to the University. This eagerness is supported by the two meetings she and her staff had with the consultant on his first day (05/19/2007) on campus and the follow-up luncheon meeting on Wednesday (05/21/2007).

All the discussions and exchanges during these meetings were centered, and rightfully so, on the training and professional development of the faculty – for enhanced instruction, research, and service.

One major result of these discussions has been the designation by the Rector of Pr. Salime Sylla as the person to handle the functions of an Office of Sponsored Programs at the University of Bamako. The establishment of this office has been the subject of previous recommendations by the consultant. More will be said and done on this matter in months and years to come. In particular, provided arrangements can be made, the consultant stands ready, as a former director of an office of sponsored programs at his University, to assist Pr. Sylla in setting up and in operating this office that is a key element of the infrastructure of a university that intends to compete with its peers at the regional and international levels.

A second major outcome of the above meetings has been the finalization of a plan for soliciting and acting on applications for

- (a) Professional development for current faculty members who hold doctoral degrees; The duration of this professional development is generally six months or less.
- (b) The pursuit of a doctoral degree, outside Mali, by advanced students who already hold the equivalent of a Master's degree (i.e., DEA);
- (c) The pursuit of Master's and doctoral degrees, outside Mali, by students who currently hold the equivalent of the Bachelor's degree (i.e., Maîtrise), and
- (d) The pursuit of advanced degrees (MS, Ph.D.), at the University of Bamako, by students who already hold the equivalent of a Bachelor's degrees.

The following clear plan of action is the translation, in English, of the meeting minutes as taken by Prof. Salime Sylla. In the plan below, the categories (a) through (d) are as specified in the bullets above.

Category (a)

Requirements of the University of Bamako:

- Submission of application packages by the interested faculty members who could be regular faculty members or those on "contract"; The objective is to acquire new competencies congruent with serving as a thesis advisor to the students pursuing MS or Ph.D. degrees at the University of Bamako; and
- An acceptable initial level in English (if going to an English speaking country like the US; Level 3 at a minimum).

Actions by the University of Bamako (UB) Upon Favorable Action on the Application

- Bring the selected applicants to the requisite level of English proficiency as determined by the destination Universities;
- Assist the selected applicants in the preparation of application packages for the post-doctoral work or studies; and
- Write letters to the host universities to state that the University of Bamako (UB) will cover the basic costs noted below. [In the future, with faculty members well-versed in some research areas, short-term post-doctoral appointments are possible. In those cases, the costs noted below are expected to be smaller.]

Requirements of Host Universities

- Adequate proficiency of the applicants in English (for the US or other English speaking countries) – as determined with a score on the Test of English as a Foreign Language (TOEFL);
- Round-Trip transportation costs (i.e., generally air fare); and

- Funds to support the expenses of the applicants at their training sites (housing, meals, ground transportation, etc.). These funds may vary slightly from one University to another, given the disparity in living expenses from one city or country to another.

Conditions of Return upon the Completion of the Professional Development

- Before an applicant can go to a foreign university, given the needs of UB and the investment by Mali, prior agreement will be in place for his/her return to serve in Mali after the completion of the professional development; and
- If the host University is in the US, then the visa to be requested will be J-1. It requires the applicant to return to his/her home country for no less than two consecutive years.

Categories (b) and (c)

Requirements of the University of Bamako

- Submission of application packages to the University of Bamako. The CV, academic records, earned degrees and diplomas, a description of the planned studies, and the fit of these studies in the short and long term plans of the prospective departments that could employ the trainees are basic elements in these applications. This fit is to be attested to in writing by the head(s) of the affected department(s); and
- An adequate level in English (i.e., at least Level 3).

Actions by the University of Bamako (UB) Upon Favorable Action on the Application

- Assist the selected applicants to reach the level of English required by the prospective host Universities (in case of studies in an English speaking country like the US);
- Assist the selected applicants to prepare competitive applications for (1) admission into the desired universities and for (2) each applicant to obtain an assistantship (either for teaching or for research); and
- Write to the prospective host Universities to signify that the University of Bamako will pay for the initial costs enumerated below.

Requirements of Host Universities

- Proficiency in English, when applicable, as defined by the host Universities (and attested to by a TOFEL score);
- Round-trip transportation costs (i.e., generally air fare); and
- Subsistence funds for the initial months at the host University, before a trainee begins to receive his/her assistantship salary.

Conditions of Return upon the Completion of the Professional Development

- In case of admission and the granting of an assistantship, the host University will send a letter to the applicant signifying same; In case the host University is in the US, the immigration form called I-20 will generally accompany the invitation/acceptance letter;
- In light of the investments by Mali and the UB, the visa to be requested for applicants going to the US is J-1. This visa requires two year residence in the home-country upon the completion of the training (and a maximum of approximately one year of practical training).

As per the underlined subsections above, the final selection of an applicant is made by the host University (that offers both admission and an assistantship). The conditions for such a final selection vary from one university to another.

In the case of category (b) and (c), each successful applicant is to receive a round-trip ticket to visit Mali after the first two years are successfully completed. Applicants whose work will be judged to be inadequate after the first two years will have to return to Mali (their sponsorship will be terminated).

Category (d)

The University of Mali currently trains students up to the Master's degree level (i.e., DEA) and, in some cases, up to the doctorate. Over a time period that is not controlled by the Rectorat, it is expected that the University will be in position to train students up to the Ph.D. degree in several disciplines. Hence, this category falls under the current practices and future ones. If and when our training and research infrastructure and capacity grow as expected, incentives will be provided to see to it that all the top students do not select to continue their studies outside Mali when we have the capacity at home. In the case theoretical Physics and Chemistry, there are reasons to believe that we will reach this capacity in a few years. Indeed, the basic resources required for theoretical work in these disciplines are access to journals, to reference books and materials, and to adequate computing powers. This statement is equally true for Mathematics. With a high speed internet connection, the acquisition of the computers will pave the way to much progress in theoretical physics and chemistry at the University of Bamako.

In fact, the TOKTEN Project has already supported a number of doctoral studies at the University with the assistance of expatriate consultants. The work of M. Siaka Sangaré, as described above, is a case in point.

III.c Outcomes of the Consultations with the Department of Physics

The work-session with the faculty members in the Department of Physics was for the development of a Master's Degree Program in Theoretical Physics [Diplôme d'Etudes Approfondies (DEA) en Physique]. In light of the upcoming implementation of the LMD, the term Master's Degree will replace that of DEA. The outcomes of the meeting were (a) the delineation of the core curriculum that characterizes the MS degree in Physics throughout the United States of America (USA), (b) discussions of the elective courses for theoretical physics and for experimental or applied physics MS degrees, (c) the needs for library and other resources for the program, (d) the needs for professional development for the current faculty members and the explicit designation of areas of specializations for several faculty members, and (e) related matters that include the preparation and submission to the University Administration of the plan of the Department and the accompanying request for funding that is needed for the implementation of the aforementioned degree program.

During the meeting, the consultant noted that throughout the US, the following five (5) core courses are always parts of the curriculum for the Master's degree in Physics. For students who are pursuing Ph.D. degree program, it is recommended to take the second part of the courses that

are in a sequence. After the first five (5) core courses, the typical MS degree student takes elective courses that are aligned with his/her area of specialization – whether the degree is in theoretical or applied Physics.

The five core courses in question are: *Mathematical Physics*, *Classical Mechanics*, *Quantum Mechanics*, *Statistical Mechanics*, and *Electrodynamics*. As per the attached listing of the MS courses at Southern University and A&M College (the home University of the consultant who is the Director of the MS Degree Program), other courses of the program are also shown, in addition to the five (5) core ones [that often have the Label I, i.e., Mathematical Physics I, Quantum Mechanics I, etc.]. For the MS degree at Southern University and A&M College in Baton Rouge (SUBR), a thesis is required. It should be noted, however, that a Master's thesis is not required by all universities in the US. There are even a few Universities that skip the MS degree altogether and take students from the BS to the Ph.D. In those cases, there clearly will not be a Master's thesis or degree. Among the institutions that only offer the MS degree, there are many that do not require a thesis for the MS degree. Further, the requirements (i.e., thesis or not) vary from one department to another in the same university.

The question of resources to support the new degree program was extensively discussed, with an open mind. Indeed, the open mind was indicated by the emphasis placed on making maximum use the Internet, electronic journals, and open course wares (at MIT and at the University of Texas at Austin), and others. OCW, at MIT, can be easily found by searching for “MIT OCW” or “OCW MIT.” It should be noted, however, that a significant number of key textbooks and reference materials have to be acquired for the new degree program. The consultant (Bagayoko) indicated his availability to help with some basic textbooks for the program. The age of information technology being here to stay, the paragraph below addresses approaches partly contingent on the availability of high speed Internet connections in all classrooms, offices, and research laboratories in the Department.

The Massachusetts Institute of Technology (MIT) has decided, for more than a year ago, to make all its courses available on the Internet. Various departments at MIT are proceeding at different speeds in the implementation of this decision. We should note, however, that the Physics Department already has a wealth of courses on the Internet (i.e., course syllabus, complete lecture notes, videos of some demonstrations and of some complete lectures, information on homework assignments, etc.). The World Lecture Hall, at the University of Texas at Austin, is an international repository of courses developed by faculty members around the world. It has been in operation since the mid-1990. When the consultant was president of the Faculty Senate at his University, he devoted a faculty convocation address to the optimal utilization of the World Lecture Hall not only by faculty members, when applicable, but also by students. In particular, for students in developing countries where books are in very short supply and the few that are available are often out of date – it makes a lot of sense to utilize the above Internet resources as much as possible. In the case of Mali, there is a language problem – given that OCW and the WLH are both mostly in English (there are a few courses in French in the WLH). The routine learning of English by university students and the investment of some funds to translate key-lecture notes constitute possible solutions.

It was also noted that a number of expatriate Malians and others could serve on the faculty at a distance. Indeed, with regular videoconferencing and videoconferencing over the Internet, and future developments bound to occur, much can be accomplished with an agile and flexible approach. The consultant is one such expatriate who could assist with Mathematical Physics, Electrodynamics, Solid State Theory, and other subfields to include advanced computations of properties of atoms, molecules, nanostructures, and solids. With the assistance of TOKTEN, the productive involvement of qualified expatriates could not only help in teaching of advanced courses, but also in research and the research supervision, with local co-directors, of the graduate students.

The immediate needs for **professional development** were noted by the faculty members and the consultant concurred. It should be noted here that while category (a) under Subsection III.b is the one that immediately applies for the needs of the Department in the short term, the other categories, (b) through (d), also apply to meeting the needs of the Department, in general, and those of the MS degree program in theoretical physics, in particular, in the long term. The seriousness and eagerness of the Department to establish this MS degree program in theoretical physics was apparent in the faculty members' determination, during the meeting, of their respective areas of professional development in order to be in position to offer all the core courses. The assignments of individual faculty members for professional development areas (for the core courses and for research) are available from the Chairman (Dr. A. Bâ).

IV. Budget Notes

One of the grants of the consultant, at his University, that had a provision for international travels, paid US\$2,000 (990.496 F CFA) for 4/5 fifth of the price of the airline ticket. The international travel budget in the grant, unfortunately, only had \$2,000 left while the full cost of the ticket was \$2,530. Consequently, TOKTEN had to pay the difference, i.e., 262.481 F CFA at the exchange rate of 495,248 F CFA per US dollar. The per diem paid to the consultant by TOKTEN was a total of 214.000 F CFA. The lodging costs, at the Grand Hotel, were 360.000 F CFA. These lodging costs were borne by the University of the consultant, through another one of his grants. *Hence, the matching funds provided for the TOKTEN funding amounted to 1.350.496 F CFA.* Hopefully, the resulting savings for TOKTEN will support other missions (of this consultant or others).

V. Recommendations for TOKTEN, the Rectorat, and the DSR of Physics

The recommendations resulting from this mission are partly apparent in the above narrative of the report. In a succinct fashion, they include the following.

- The Department of Physics is urged to submit to the University Administration, as soon as possible, the plan for the establishment of the MS Degree Program in Theoretical Physics. The urgency stems from the fact that the professional development activities for the faculty, as delineated during the meeting with the consultant, should take place during the summer of 2007 to permit a full implementation of the MS degree program in theoretical physics during the 2007-08 Academic Year.

- In light of the discussions relative to the use of high speed Internet connections in the implementation of the MS Degree Program in Theoretical Physics, the Rectorat is urged to continue its efforts in the establishment of such connections in the Department (and the rest of the University), preferably before the beginning of the 2007-08 Academic Year.
- It is recommended that the TOKTEN project and the Rectorat provide any assistance available to them to support the establishment of the Office of Sponsored Programs. The benefits to be derived from this Office are simply enormous, at least in the long term. Further, both the Rectorat and TOKEN are hereby informed that this consultant is available to assist with the noted establishment of the office.
- Once someone with the requisite English proficiency is added to the staff of the office, TOKTEN should inform its many hundreds of consultants around the world and provide them with contact information (i.e., E-mail address and telephone number) for Pr. Salime Sylla. These consultants could be great sources of information on funding opportunities from international, regional, philanthropic (i.e., international foundations), and other entities.
- Inasmuch as securing funding for the training of trainers [categories (a) through (d)] is a form of acquiring sponsored funding, it is hoped that the Office of Sponsored Programs, provided it has the needed staff members, could assist with the preparation of applications as described in Subsection III.b of this report. The conference held on Thursday April 22, along with the three books that were provided, constituted a start in the massive information dissemination work that has to be ongoing if Mali is to take advantage of vast opportunities. [In 2004, there were over 80.000, 60.000, and 50.000 Indian (from India), Chinese, and South Korean students in the United States, respectively. Most of these students were graduate students for whom most of the costs are borne by the American Universities in the form of teaching or research assistantships.]
- It is recommended that the Rectorat work with Mr. Goundiam at the Ministry of Education, the Coordinator of the West Virginia Graduate Assistantship (and some undergraduate scholarship) program. Pr. Iba N'Diaye worked hard to have fellowships offered to Mali. **It behooves us to find qualified applicants for these fellowships before the fall semester of 2007!**
- The consultant learned, during conversations related to the establishment of the MS degree program in Physics, that most faculty members in the College of Sciences and Technologies have neither an office, nor a laboratory. It is therefore recommended that the Rectorat, as soon as possible, approach the Ministry of Education in writing, to identify and to reserve space for the construction of building to house faculty offices and research laboratories. It is understood that whether the request is granted or not is not under the control of the Rectorat. However, it is critical that the Rectorat be on records for requesting the land now, irrespective of the fact that this consultant has no ideas, at this moment, as to when funds may be found for such buildings. Without an office, it is difficult, if not impossible, to have faculty members (a) conduct as much research as

desirable, (b) perform as much public and professional services as possible, and (c) be available to graduate and undergraduate students for course or research consultations. This request applies to all the colleges of the University. Hence, the spaces (lands) to request should be located as closely to the affected college as possible. The lack of provision faculty and staff offices and for research laboratories, in adequate number, was a serious oversight in the planning of the University in the 1990s.

- As for the thesis work of M. Siaka Sangaré, it is nearing completion. As noted above, the speed with which he will write Chapter 3, the major and longest one, will determine whether he can finish and defend in the fall semester or not. With the constant encouragement of Dr. K. Konaté, he has done a commendable work in terms of fitting and of analysis of GLOBE and METEO data. *So, the recommendation to M. Sangaré is to do his best to focus on this writing during the summer.* Dr. Komakan and I will naturally do the reviewing and editing as speedily as possible.