

REQUEST FOR PROPOSALS

FEASIBILITY STUDY FOR THE METEOROLOGICAL AND HYDROLOGICAL SERVICE MODERNIZATION PROJECT IN THE REPUBLIC OF CROATIA

Submission Deadline: **4:00 P.M.**

LOCAL TIME

SEPTEMBER 10, 2007

Submission Place: Mr. Nino Radetic
Technical Director
Meteorological and Hydrological Service
Republic of Croatia
Gric 3
HR-10000 Zagreb, Croatia

Phone: +385-1-45-65-784
Fax: +385-1-48-51-901
Email: radetic@cirus.dhz.hr

**SEALED PROPOSALS SHALL BE CLEARLY MARKED AND RECEIVED PRIOR TO THE
TIME AND DATE SPECIFIED ABOVE. PROPOSALS RECEIVED AFTER SAID TIME
AND DATE WILL NOT BE ACCEPTED OR CONSIDERED.**

REQUEST FOR PROPOSALS

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Section 1: INTRODUCTION

The U.S. Trade and Development Agency (USTDA) has provided a grant to the Grantee, the Meteorological and Hydrological Service of the Republic of Croatia (MHS), for a meteorological and hydrological service modernization feasibility study in Croatia. The grant agreement is attached at Annex 4 for reference. The Grantee is soliciting technical proposals from qualified U.S. firms to provide expert consulting services to carry out the Feasibility Study.

1.1 BACKGROUND SUMMARY

The establishment of an effective national system for forecasting environmental crises and the ability to respond to those crises are major concerns for any country as it tries to guarantee national security and stability. Adverse weather, flooding activity and environmental problems cost the Croatian economy around \$218 million annually, severely impacting the quality of life of its citizens and economic development. The impact of flooding in recent years illustrates the need for modernizing Croatia's environmental monitoring and forecast capabilities, including improved sensing systems and reliable high-speed data communications infrastructure. Accurate weather and flood forecasting is especially important for Croatia because of its strategic location on the Balkan Peninsula and its extended coastline on the Adriatic Sea, which is well known for the rapid onset of very dangerous weather conditions, and the mountainous terrain which exacerbates flooding conditions. As a result of the lack of appropriate operational monitoring, warning and forecasting systems, weather conditions continue to cause destruction and disrupt the economy.

The MHS's mission is to produce and provide meteorological and hydrological information, particularly the environmental forecasting services and warnings necessary to: (1) ensure the safety of its citizens; (2) permit the efficient operations of the nation's commerce; (3) preserve the nation's natural resources; and (4) permit the efficient operations of rescue, protection and civil defense. The MHS is tasked with developing a comprehensive plan to modernize the national meteorological and hydrological observational networks and to modernize other weather, water and environmental monitoring and forecasting infrastructure. In 2005 MHS had a budget of roughly €10 million and employed over 400 people. Recognizing the deficiencies of the current system, the MHS has taken steps towards upgrading its meteorological and hydrological infrastructure by liaising with the National Electricity Company for the establishment of lightning monitoring system. The installation of a network of additional air quality observation (about 10 new stations), as well as upgrading and filling the gaps of hydrological network, are currently being considered.

A background Definitional Mission is provided for reference in Annex 2.

1.2 OBJECTIVE

The MHS believes the most immediate benefits can be gained by implementing an integrated network of hydrological and meteorological systems consisting of a: warning system; environmental monitoring system; Doppler weather radar network; lightning location network; upper air sounding network; surface hydrological and meteorological observation network; and associated analysis and forecasting systems. Together, these systems would form an integrated Croatian National Monitoring, Nowcasting and Forecasting system which, in conjunction with Croatian information and communication systems, could provide timely alerts and warnings to the government, industry and the general population. Such a system would allow the MHS to better support its sister meteorological and hydrological agencies in the region and allow Croatian emergency personnel to anticipate and respond to weather-related events. The objective of this feasibility study is to design a modernization plan to implement this integrated network of hydrological and meteorological systems. The Terms of Reference (TOR) for this Feasibility Study is attached as Annex 5.

1.3 PROPOSALS TO BE SUBMITTED

Technical proposals are solicited from interested and qualified U.S. firms. The administrative and technical requirements as detailed throughout the Request for Proposals (RFP) will apply. Specific proposal format and content requirements are detailed in Section 3.

COST will not be a factor in the evaluation and therefore, cost proposals should not be submitted; upon detailed evaluation of technical proposals, one firm will be selected for contract negotiations. The amount for the negotiated contract has been established by a USTDA grant of U.S. \$495,760 dollars.

1.4 CONTRACT FUNDED BY USTDA

The negotiated contract will be funded by USTDA in accordance with the terms and conditions of its grant to the Grantee. The contract must include certain USTDA mandatory clauses relating to nationality, taxes, payment, reporting, and other matters. The USTDA nationality requirements and the USTDA mandatory clauses are attached at Annexes 3 and 4 for reference.

Section 2: INSTRUCTIONS TO PROPOSERS

2.1 PROJECT TITLE

The project is called "**Meteorological and Hydrological Service Modernization Project in the Republic of Croatia.**"

2.2 DEFINITIONS

Please note the following definitions of terms as used in this RFP.

The term "Request for Proposals" means this solicitation of a formal technical proposal including qualifications statement.

The term "Offeror" means the U.S. individual, or U.S. firm, including any and all subcontractors, which responds to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.

2.3 DEFINITIONAL MISSION REPORT

USTDA sponsored a Definitional Mission to address technical, financial, sociopolitical, environmental and other aspects of the proposed project. A copy of the Report is attached at Annex 2 for background information only.

2.4 EXAMINATION OF DOCUMENTS

Offerors should carefully examine this RFP. It will be assumed that Offerors have done such inspection and that through examinations, inquiries and investigation they have become familiarized with local conditions and the nature of problems to be solved during the execution of the Feasibility Study.

Offerors shall address all items as specified in this RFP. Failure to adhere to this format may disqualify an Offeror from further consideration.

Submission of a proposal shall constitute evidence that the Offeror has made all the above mentioned examinations and investigations, and is free of any uncertainty with respect to conditions which would affect the execution, and completion of the Feasibility Study.

2.5 PROJECT FUNDING SOURCE

The Feasibility Study will be funded under a grant from USTDA. The total amount of the grant is not to exceed U.S. \$495,760 dollars.

2.6 RESPONSIBILITY FOR COSTS

Offeror shall be fully responsible for all costs incurred in the development and submission of the proposal or any other cost incurred by Offeror prior to issuance of an agreement or contract. Neither USTDA nor the Grantee assumes any contractual obligation as a result of the issuance of this proposal request, the preparation or submission of a proposal by an Offeror, the evaluation of proposals, or final selection.

2.7 TAXES

Offerors should submit proposals which note that in Annex 4, USTDA Mandatory Contract Provisions, USTDA funds are not to be used to pay taxes or duties under the laws of host country.

2.8 CONFIDENTIALITY

The Grantee will use its best efforts to preserve the confidentiality of any business proprietary or confidential information submitted by the Offeror, which is clearly designated as such by the Offeror.

2.9 ECONOMY OF PROPOSALS

Proposal documents should be prepared simply and economically, providing a comprehensive and concise description of the Offeror's capabilities to satisfy the requirements of the RFP. There is no necessity for expensive bindings, colored displays, or other promotional material unless such material is absolutely pertinent to the proposal. Emphasis should be placed on completeness and clarity of content.

2.10 SUBSTANTIVE PROPOSALS

The Offeror shall certify (a) that its proposal is genuine and is not made in the interest of, or on the behalf of, any undisclosed person, firm, or corporation, and is not submitted in conformity with, and agreement of, any undisclosed group, association, organization, or corporation; (b) that it has not directly or indirectly induced or solicited any other Offeror to put in a false proposal; (c) that it has not solicited or induced any other person, firm, or corporation to refrain from submitting a proposal; and (d) that it has not sought by collusion to obtain for himself any advantage over any other Offeror or over the Grantee or USTDA or any employee thereof.

2.11 CONDITIONS REQUIRED FOR PARTICIPATION

Only U.S. firms are eligible to participate in this tender. However, U.S. firms may utilize subcontractors from host country for up to 20 percent of the amount of the USTDA grant. USTDA nationality requirements are detailed in Annex 3.

2.12 LANGUAGE OF PROPOSAL

All proposal documents shall be prepared and submitted in English, and only English.

2.13 PROPOSAL SUBMISSION REQUIREMENTS

The **Cover Letter** in the proposal must be addressed to:

Mr. Nino Radetic
Technical Director
Meteorological and Hydrological Service
Republic of Croatia
Gric 3
HR-10000 Zagreb, Croatia

Phone: +385-1-45-65-784
Fax: +385-1-48-51-901
Email: radetic@cirus.dhz.hr

An Original and eight (8) copies of your proposal must be received at the above address no later than 4:00 P.M., on September 10, 2007.

Proposals may be either sent by mail, overnight courier, or hand-delivered. Whether the proposal is sent by mail, courier or hand-delivered, the Offeror shall be responsible for actual delivery of the proposal to the above address before the deadline. Any proposal received after the deadline will be returned unopened.

Upon timely receipt, all proposals become the property of the Grantee.

2.14 PACKAGING

Each proposal must be sealed to ensure confidentiality of the information. The proposals should be individually wrapped and sealed, and labeled for content including "original" or "copy number x"; the original and eight (8) copies should be collectively wrapped and sealed, and clearly marked for content.

Neither USTDA nor the Grantee will be responsible for premature opening of proposals not properly labeled.

2.15 AUTHORIZED SIGNATURE

The proposal must contain the signature of a duly authorized officer or agent of the Offeror empowered with the right to bind the Offeror.

2.16 EFFECTIVE PERIOD OF PROPOSAL

The proposal shall be binding upon the Offeror for sixty (60) days after the proposal due date, and Offeror may withdraw or modify this proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal.

2.17 EXCEPTIONS

Firms agree by their response to the RFP announcement to abide by the procedures set forth therein. Material modifications in the TOR or responsibilities of the parties will not be accepted.

Any exceptions in the proposal shall be clearly identified, and shall include the scope of such exception, and its impact, on the procurement. The Grantee shall make final determination as to the responsiveness of such exceptions and their acceptability.

2.18 OFFEROR QUALIFICATIONS

As provided in Section 3, Offerors shall submit evidence that they have relevant past experience and have previously delivered advisory and Feasibility Study services similar to those required in the TOR.

2.19 RIGHT TO REJECT PROPOSALS

The Grantee reserves the right to reject any and all proposals and to accept or reject any or all of the items in the proposal, and to award the contract in whole or in part if it is deemed in the best interest of the Grantee.

2.20 PRIME CONTRACTOR RESPONSIBILITY

Offerors have the option of subcontracting parts of the services they propose. The Offeror's proposal must include a description of any anticipated subcontracting arrangements, including the name, address, and qualifications of consultants and subcontractors. USTDA nationality provisions are set forth in detail in Annex 3. The successful Offeror shall cause appropriate provisions of its contract, including all mandatory USTDA clauses, to be inserted in all subcontracts ensuing to ensure fulfillment of all contractual provisions by subcontractors.

2.21 AWARD

An award resulting from this RFP shall be made to the best qualified Offeror, taking into consideration the evaluation factors set forth herein; however, the right is reserved to reject any and all proposals received and, in all cases, the Grantee will be the judge as to whether a proposal has or has not satisfactorily met the requirements of this RFP.

2.22 COMPLETE SERVICES

The successful Offeror shall be required to (a) furnish all supplies, supervision, transportation, and other execution accessories, services, and facilities; (b) provide and perform all necessary labor; and (c) in accordance with good technical practice, with due diligence, and in accordance with the requirements, stipulations, provisions and conditions of this RFP and the resultant contract, execute and complete all specified work to the satisfaction of the Grantee.

2.23 INVOICING AND PAYMENT

Deliverables under the contract shall be delivered on a schedule to be agreed upon in a contract with the Grantee. The Contractor may submit invoices to the designated Grantee Project Director in accordance with a schedule to be negotiated and included in the contract. Upon approval of each invoice, the Grantee will forward the invoice to USTDA which will process payment to the Contractor. All payments by USTDA under the Grant Agreement will be made in U.S. currency.

Section 3: PROPOSAL FORMAT AND CONTENT

To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, all proposals must follow the format described in this section.

Proposal sections and pages shall be appropriately numbered and the proposal shall include a Table of Contents. Offerors are encouraged to submit concise and clear responses to the RFP. Proposals shall contain all elements of information requested without exception. Instructions regarding the required scope and content are given in this section. The Grantee reserves the right to include any part of the selected proposal in the final contract.

The proposal shall consist of a technical proposal only. No cost proposal is required as the value of the USTDA grant is established at U.S. \$495,760 dollars.

Offerors shall submit one (1) original and eight (8) copies of the proposal. Proposals received by fax cannot be accepted.

The following sections and content are required for each proposal:

- Transmittal Letter,
- Cover/Title Page,
- Table of Contents,
- Introduction and Executive Summary,
- Company Information,
- Organizational Structure, Management Plan, and Key Personnel,
- Technical Approach and Work Plan,
- Experience and Qualifications, and
- Miscellaneous.

Detailed requirements and directions for the preparation of each section are presented below.

3.1 SECTION 1: INTRODUCTION AND EXECUTIVE SUMMARY

An Executive Summary should be prepared describing the major facts or features of the proposal, including any conclusions, assumptions, and generalized recommendations the Offeror desires to make. Offerors are requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

3.2 SECTION 2: COMPANY INFORMATION

3.2.1 Company Profile

Provide the information listed below relative to the Offeror's firm. If the Offeror is proposing to subcontract some of the proposed work to another firm(s), similar information must be provided for each subcontractor. Offerors are requested to limit the length of the Company Profile Information to one (1) page per firm.

1. Name of firm and business address, including telephone and fax numbers.
2. Year established (include former firm names and year established, if applicable).
3. Type of ownership and parent company, if any.
4. Project Manager's name, address, telephone and fax number, if different from (1).

3.2.2 Offeror's Authorized Negotiator

Provide name, title, address, telephone and fax number of the Offeror's authorized negotiator. The person cited shall be empowered to make binding commitments for the Offeror and its subcontractors, if any.

3.2.3 Negotiation Prerequisites

1. Discuss any impact of any current or anticipated commitments which may impact the ability of the Offeror or its subcontractors to complete the Feasibility Study as proposed and within the project schedule.
2. Identify any specific information which is needed from the Grantee before commencing contract negotiations.

3.3 SECTION 3: ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL

Describe the Offeror's proposed project organizational structure. Discuss how the project will be managed including the principal and key staff assignments for this Feasibility Study. Identify the Project Manager who will be the individual responsible for this project. The Project Manager must have the responsibility and authority to act on behalf of the Offeror in matters related to the proposed Feasibility Study.

Provide a listing of personnel (including subcontractors and consultants) to be engaged in the project, either U.S. or local with the following information for key staff: position in the project; pertinent experience, curriculum vitae; other relevant information. If subcontractors are to be used, the organizational relationship between the firms must be described.

A manpower schedule and the level of effort for the project period, by activities and tasks, as detailed under the Work Plan shall be submitted. A statement confirming the availability of the proposed project manager and key staff over the duration of the project must be included in the proposal.

3.4 SECTION 4: TECHNICAL APPROACH AND WORK PLAN

Describe in detail the proposed technical approach and work plan. Discuss the project requirements as perceived by the Offeror. Include a brief narrative of tasks within each activity series. Note specifically any task activities included or excluded and which may differentiate Offeror's technical approach from others. Begin with the information gathering phase and continue through delivery and approval of all required reports.

Prepare a detailed schedule of performance that describes all activities and tasks within the Technical Work Plan, including periodic reporting or review points, incremental delivery dates, and other project milestones.

Based on the Technical Work Plan, and previous project experience, explain when and where Offeror will require support from the Grantee. Detail the amount of staff time required by the Grantee or participating agencies and any work space or facilities needed to complete the Feasibility Study.

Offerors may elect to propose alternative approaches and/or activities and tasks if it is felt they will provide technical, schedule, or other advantages to the Grantee. The Offeror should cite the applicability of alternative approaches/activities to achievement of project objectives and the projected advantages to be gained through their use. To assure that all proposals will be comparable and any alternatives will be evaluated against a relevant background each Offeror must provide a full response to the RFP as written before any full or partial alternative is proposed. Alternatives must be clearly identified as such.

3.5 SECTION 5: EXPERIENCE AND QUALIFICATIONS

Provide a discussion of the Offeror's experience and qualifications which are relevant to the objectives and TOR for the Feasibility Study. If a subcontractor(s) is being used, similar information must be provided for the prime and each subcontractor firm proposed for the project. Relevant experience and qualifications of key staff proposed shall be provided including letters of commitment from the individuals proposed concerning their availability for contract performance.

As many as possible but not more than six (6) relevant and verifiable project references must be provided, including the following information:

Project name,
Name and address of client (indicate if joint venture),
Client contact person (name/ position/ current phone and fax numbers),
Period of Contract,
Description of services provided,
Dollar amount of Contract, and
Status and comments.

Offerors are strongly encouraged to include in their experience summary primarily those projects that are similar to or larger in scope than the Feasibility Study as described in this RFP.

Section 4: AWARD CRITERIA

Individual proposals will be initially evaluated by a Procurement Selection Committee of representatives from the Grantee. The Committee will then conduct a final evaluation and completion of ranking of qualified Offerors, and the Grantee shall promptly negotiate a contract with the best qualified Offeror. If a satisfactory contract cannot be negotiated with the best qualified Offeror, negotiations will be formally terminated. Negotiations shall then be undertaken with the second most qualified Offeror and so forth.

The selection of the Contractor will be based on the following criteria:

1. The Firm or Team's Experience and Work Plan (80 points) - The firm or team's key personnel must have experience with integrated meteorological and hydrological systems design, planning, and implementation. The proposed team/ personnel for this project must demonstrate project qualifications for integrated meteorological and hydrological systems including planning, design, and implementation experience to include areas such as technology, operations, personnel, budgeting, facilities, and organizational issues. This experience must include all of the following:

- Assessing, developing, designing, and implementing automated weather and environmental monitoring systems including but not limited to:
 - o Surface hydrological and meteorological observation equipment and systems;
 - o Doppler weather radar equipment and networks;
 - o Upper air sounding equipment and networks;
 - o Environmental monitoring equipment and networks;
(air pollution, acid rain, surface ozone);
 - o Sea-buoy equipment & networks;
 - o Lightning detection and location equipment and networks;
 - o Computer resources and data management systems
 - o Analysis and forecasting technology and systems;
 - o Hydro-met warning decision support and systems;

- Developing and implementing integrated processing of hydro-meteorological data and forecast distribution systems.
- Implementing technology supporting real-time situational analysis, decisions, and economic returns analysis.
(Examples of experience and similar projects completed must be given to demonstrate specific experience. Individual team members' CVs must be included in the proposal.)
- Firm or team's demonstration of understanding of the problems and tasks required to address them, and responsiveness of the proposal to the technical scope of the feasibility study. Development of a work program, broken down into the major work areas, clearly defining the scope of work, and defining the activities, schedule, and effort should be included in the proposal.

2. The firm or team's personnel shall demonstrate intimate familiarity with the impact of current Croatian meteorological and hydrological management legislation, regulations, and organizational responsibilities; as well the relevant EU Directives and WMO recommendations applicable to the implementation of the Modernization Plan. (10 points).

3. The firm or team should demonstrate knowledge regarding project finance, and provide specific finance recommendations. (10 points).

Proposals which do not include all requested information may be considered non-responsive.

Price will not be a factor in contractor selection.

ANNEX 1

Mr. Nino Radetic; Technical Director; Meteorological and Hydrological Service;
Republic of Croatia; Gric 3, HR-10000 Zagreb, Croatia; Phone: +385-1-45-65-784; Fax:
+385-1-48-51-901; E-mail: radetic@cirus.dhz.hr

B-Croatia: Meteorological and Hydrological Service Modernization Project

POC Evangela Kunene, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel: (703) 875-4357, Fax: (703) 875-4009. Meteorological and Hydrological Service Modernization Project. The Grantee, the Meteorological and Hydrological Service of the Republic of Croatia (MHS), invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms which are qualified on the basis of experience and capability to develop a feasibility study for a meteorological and hydrological service modernization feasibility study in Croatia.

As a consequence of spacious mountainous areas with high precipitation and the presence of a wide valley of lowland watercourses, over 15% of Croatia's inland territory is subject to frequent flooding. The low-lying part of Zagreb area, the Croatian capital, is occasionally flooded by the Sava River, while the upper portion of the city is hit by flash floods originating in storm torrents from the Medvednica Mountains. Split, Rijeka, Šibenik and Dubrovnik are also subject to frequent flash floods. As a result of these conditions, the MHS of the Republic of Croatia was given the responsibility of developing a comprehensive plan for the modernization of the national meteorological and hydrological observational networks and for modernization of other weather, water and environmental monitoring and forecasting infrastructure. In an effort to protect its citizens and tourism-reliant economy, the MHS is looking to develop meteorological and hydrological monitoring capability to forecast and react appropriately to impending weather conditions.

The establishment of an effective national system for forecasting environmental crises and the ability to respond to those crises are major concerns for any country as it tries to guarantee national security and stability. Adverse weather, flooding activity and environmental problems cost the Croatian economy around \$218 million annually, severely impacting the quality of life of its citizens and economic development. The impact of flooding in recent years illustrates the need for modernizing Croatia's environmental monitoring and forecast capabilities, including improved sensing systems and reliable high-speed data communications infrastructure. Accurate weather and flood forecasting is especially important for Croatia because of its strategic location on the Balkan Peninsula and its extended coastline on the Adriatic Sea, which is well known for the rapid onset of very dangerous weather conditions, and the mountainous terrain which exacerbates flooding conditions. As a result of the lack of appropriate operational monitoring, warning and forecasting systems, weather conditions continue to cause destruction and disrupt the economy.

The MHS's mission is to produce and provide meteorological and hydrological information, particularly the environmental forecasting services and warnings necessary to: (1) ensure the safety of its citizens; (2) permit the efficient operations of the nation's commerce; (3) preserve the nation's natural resources; and (4) permit the efficient operations of rescue, protection and civil defense. The MHS is tasked with developing a comprehensive plan to modernize the national meteorological and hydrological observational networks and to modernize other weather, water and environmental monitoring and forecasting infrastructure. In 2005 MHS had a budget of roughly €10 million and employed over 400 people. Recognizing the deficiencies of the current system, the MHS has taken steps towards upgrading its meteorological and hydrological infrastructure by liaising with the National Electricity Company for the establishment of lightning monitoring system. The installation of a network of additional air quality observation (about 10 new stations), as well as upgrading and filling the gaps of hydrological network, are currently being considered.

The MHS believes the most immediate benefits can be gained by implementing an integrated network of hydrological and meteorological systems consisting of a: warning system; environmental monitoring system; Doppler weather radar network; lightning location network; upper air sounding network; surface hydrological and meteorological observation network; and associated analysis and forecasting systems. Together, these systems would form an integrated Croatian National Monitoring, Nowcasting and Forecasting system which, in conjunction with Croatian information and communication systems, could provide timely alerts and warnings to the government, industry and the general population. Such a system would allow the MHS to better support its sister meteorological and hydrological agencies in the region and allow Croatian emergency personnel to anticipate and respond to weather-related events.

The Terms of Reference (TOR) for the study would analyze the modernization and expansion requirements of the capabilities of Meteorological and Hydrological Service of the Republic of Croatia.

The U.S. firm selected will be paid in U.S. dollars from a \$495,760 grant to the Grantee from the U.S. Trade and Development Agency (USTDA).

A detailed Request for Proposals (RFP), which includes requirements for the Proposal, the TOR, and a background definitional mission report are available from USTDA, at 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901. To request the RFP in PDF format, please go to: <https://www.ustda.gov/USTDA/FedBizOpps/RFP/rfpform.asp>. Requests for a mailed hardcopy version of the RFP may also be faxed to the IRC, USTDA at 703-875-4009. In the fax, please include your firm's name, contact person, address, and telephone number. Some firms have found that RFP materials sent by U.S. mail do not reach them in time for preparation of an adequate response. Firms that want USTDA to use an overnight delivery service should include the name of the delivery service and your firm's account number in the request for the RFP. Firms that want to send a courier to USTDA to retrieve the RFP should allow one hour after faxing the

request to USTDA before scheduling a pick-up. Please note that no telephone requests for the RFP will be honored. Please check your internal fax verification receipt. Because of the large number of RFP requests, USTDA cannot respond to requests for fax verification. Requests for RFPs received before 4:00 PM will be mailed the same day. Requests received after 4:00 PM will be mailed the following day. Please check with your courier and/or mail room before calling USTDA.

Only U.S. firms and individuals may bid on this USTDA financed activity. Interested firms, their subcontractors and employees of all participants must qualify under USTDA's nationality requirements as of the due date for submission of qualifications and proposals and, if selected to carry out the USTDA-financed activity, must continue to meet such requirements throughout the duration of the USTDA-financed activity. All goods and services to be provided by the selected firm shall have their nationality, source and origin in the U.S. or host country. The U.S. firm may use subcontractors from the host country for up to 20 percent of the USTDA grant amount. Details of USTDA's nationality requirements and mandatory contract clauses are also included in the RFP.

Interested U.S. firms should submit their Proposal in English directly to the Grantee by 4:00 P.M. Local Time, September 10, 2007 at the above address. Evaluation criteria for the Proposal are included in the RFP. Price will not be a factor in contractor selection, and therefore, cost proposals should NOT be submitted. The Grantee reserves the right to reject any and/or all Proposals. The Grantee also reserves the right to contract with the selected firm for subsequent work related to the project. The Grantee is not bound to pay for any costs associated with the preparation and submission of Proposals.

ANNEX 2

FINAL REPORT

DEFINITIONAL MISSION

FEASIBILITY STUDY OF THE MODERNIZATION OF THE METEOROLOGICAL AND HYDROLOGICAL SERVICE OF THE REPUBLIC OF CROATIA

USTDA-06-Q-81-249

February 2007

Prepared by:

Enviromation Inc.

11402 Boathouse Pointe
Spotsylvania, VA 22553
Telephone: +1-540-972-2446
Fax: +1-540-972-2425
Email: Enviromat@aol.com

In Association with:

Innovative Hydrology
2280 Grass Valley Hwy #211
Auburn, CA 95603
Telephone: +1 530 885 8858
Email: Mark.Heggli@InnovativeHydrology.com



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The U.S. Trade and Development Agency

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit for U.S. exports of goods and services.



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

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A. Executive Summary¹

Project Summary	
Host Country	Croatia
Project Name	Modernization of the Meteorological and Hydrological Service of the Republic of Croatia
Sector	Environmental
Region	Europe
Location	Zagreb, Croatia
Investment Required	\$47 million
Export Potential	\$38 million
Project Grantee	Meteorological and Hydrological Service of the Republic of Croatia

Project Location: The Project is based in Zagreb with meteorological stations throughout Croatia.

Project Description: The Meteorological and Hydrological Service (MHS) of the Republic of Croatia has been tasked by the Government of Croatia to develop a comprehensive plan for the modernization of the national meteorological and hydrological observational networks as well as the modernization of other infrastructure components for weather, water and environmental monitoring and forecasting capabilities. MHS requests the assistance of the U.S. Trade and Development Agency (USTDA) in funding a Feasibility Study in order to precisely define the requirements for the Project, determine budgetary needs and prepare specifications for the systems to be purchased.

Adverse weather, flooding activity and environmental problems are the cause of around \$218 million of losses annually to the economy of Croatia, which severely impacts the quality of life of its citizenry and economic development. The impact of flooding in recent years illustrates the need for modernization of the environmental monitoring and forecast activities, including improved real-time remote sensing systems and reliable high-speed data communication infrastructure. Accurate forecasts of changes in weather is the basis of real-time decisions which improve the efficient operations of key segments of the nation's commerce, such as agriculture, fisheries, transportation, construction, energy and water resource management

Project Sponsor's Capability and Commitment: MHS is a governmental institution established by the Government of The Republic of Croatia as the central state institution for meteorology, hydrology, climatology, and air quality. It provides expert services to state administration bodies and the public, as described in the Law on MHS services in Croatia (Official Gazette No. 14, 1978).

Incentives for Implementation: There are a number of factors favorable for the implementation of this Project. Foremost is the economic losses caused by natural hazards in

¹ Portions of the Proposal document developed and submitted to USTDA by the Meteorological and Hydrological Service of the Republic of Croatia have been utilized within this report with permission.



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Croatia which exceed \$218 million per year and are increasing. There is a strong economic incentive to reduce this impact. In addition tourism, shipping, and transportation will benefit from improved forecasting stimulating economic activity within the country. The trend analysis of damages caused by natural hazards in Croatia (Figure 3) shows a slight increase during the two decade period (1980-2000).

Barriers to Implementation: On the other hand, some barriers to implementation exist. The most troublesome being the impact on MHS' budget and operations of the current national hail monitoring and suppression program. MHS is working with local governments to assume operational control of hail suppression activities so that MHS can focus on improving Nowcasts and Forecasts of the weather which generates the hail.

Implementation Financing: A U. S. Export Import-Bank (ExIm Bank) financing request is in preparation and the World Bank has also expressed interest in financially supporting the Project as part of a regional initiative.

U.S. Export Potential: MHS has a long-standing relationship with leading American suppliers of weather (water) monitoring and forecasting technologies now available in the United States. The support of the USTDA to this Project is fully justified by the significant export sales opportunities for U.S. manufacturers which the Project reflects. MHS expects that the import component will be approximately 80% of the final contract value representing nearly \$38 million in potential exports from the United States.

Foreign Competition and Market Entry Issues: U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. European firms have an advantage due to geographical proximity and historical trade patterns.

Development Impact: Accurate weather and flood forecasting is especially important for Croatia because of its strategic location on the Balkan Peninsula and its extended coastline on the Adriatic Sea which is well known for the rapid onset of very dangerous weather conditions, and the mountainous terrain which exacerbates flooding conditions. The country suffers severe economic damage every year from severe thunderstorm conditions and winter storms, which currently are not sufficiently manageable as a result of the lack of appropriate operational monitoring, warning and forecasting systems. Preparation of a precise sector analysis of weather, environment and flooding related losses is a key issue of the proposed feasibility study.

Impact on the Environment: This Project will have a positive impact on the environment.

Impact on U.S. Labor: This Project is expected to have a positive impact on U.S. labor if implemented.

Qualifications: The key personnel must have experience with integrated meteorological and hydrological systems planning and implementation. Experience in Eastern European



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management legislation, systems, operations and the Croatian government's organizational structure of warning and alert management is required.

Justification: Improved warning capabilities derived from this Project will be of great benefit to Croatia, its citizens and to the countries in the region. The execution of the proposed Feasibility Study will assure that leading United States manufacturers and suppliers of high technology meteorological and hydrological technologies and integrating software systems will be in a favorable position for supplying equipment to MHS as the Project goes forward. The total American exports to be expected are in the range of \$38 million.

Aim of the Terms of Reference: It is the objective of the terms of reference to optimize the meteorological and hydrological monitoring, warning, and forecasting systems to provide effective short-term Nowcasts (0-6 hours), and short-term Forecasts (6-72 hours), and longer of all severe hydrological, meteorological and environmental conditions which threaten life and property in the Republic of Croatia.

Outline of the Terms of Reference: The Terms of Reference (TOR) are presented in a series of tasks summarized as:

- Task 1: Kickoff Meeting
- Task 2: Needs Assessment
- Task 3: Implementation and Financing Plan
- Task 4: Human Resources Development and Training Plan
- Task 5: Cost/Benefit Analysis
- Task 6: Regulatory and Environmental Review
- Task 7: Development Impact Assessment
- Task 8: Final Report

Period of Performance: The period of performance for this Feasibility Study is projected as 12 months.

Budget: USTDA support this Feasibility Study by providing a grant of \$496,000 to MHS to execute the Feasibility Study is recommended.

Recommendations: USTDA support this Feasibility Study by providing a grant of \$496,000 to MHS to execute the Feasibility Study is recommended.

Portfolio Assessment: This is the first project in Croatia of this type and no other projects are underway. Therefore a portfolio assessment is not applicable to this Project.



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

B. Project Description

Host Country	Croatia
Project Name	Modernization of the Meteorological and Hydrological Service of the Republic of Croatia
Sector	Environmental
Region	Europe
Location	Zagreb
Investment Required	\$47 million
Export Potential	\$38 million
Project Grantee	Meteorological and Hydrological Service of the Republic of Croatia



Project Location: The Project is based in Zagreb with meteorological stations throughout Croatia.

Project Overview: The Meteorological and Hydrological Service (MHS) of the Republic of Croatia has been tasked by the Government of Croatia to develop a comprehensive plan for the modernization of the national meteorological and hydrological observational networks as well as for modernization of other infrastructure components for weather, water and environmental monitoring and forecasting capabilities. MHS requests the assistance of the U.S. Trade and Development Agency (USTDA) in funding a Feasibility Study in order to precisely define the requirements for the Project, determine budgetary needs and prepare specifications for the systems to be purchased.

Adverse weather, flooding activity and environmental problems are the cause of around \$218 million of losses annually to the economy of Croatia, which severely impacts the quality of life of its citizenry and economic development. The impact of flooding in recent years illustrates the need for modernization of the environmental monitoring and forecast activities, including improved real-time remote sensing systems and reliable high-speed data communication infrastructure. Accurate forecasts of changes in weather is the basis of real-time decisions which improve the efficient operations of key segments of the nation's commerce, such as agriculture, fisheries, transportation, construction, energy and water resource management.



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The radar network in Croatia is of strategic importance to Southeast Europe because of its position and the specific shape. It covers a considerable part of adjacent countries and the Adriatic sea. The establishment of such a network will fill gaps in the European meteorological radar network (OPERA).

It is the mission of the MHS to produce and provide meteorological and hydrological information, particularly the environmental forecasting services and warnings necessary to ensure the safety of its citizens, permit the efficient operations of the nation's commerce, preserve the nation's natural resources, and permit the efficient operations of rescue, protection and civil defense.

The specific mission needs are to:

- Provide accurate and timely weather observations and forecasts;
- Provide severe and hazardous weather warnings;
- Provide accurate and timely flash flood warnings and forecasts;
- Maintain climatological, environmental, hydrological, and oceanographic records;
- Provide real-time hydrological data;
- Monitor aquifers supporting major population areas for water level;
- Monitor base-line air quality parameters on national level;
- Provide oceanographic observations and forecasts; and
- Provide a long term climatological data base.

MHS, based on its current analyses, has concluded that the most immediate benefits can be gained by the implementation of an integrated network of hydrological and meteorological systems consisting of a:

- Warning System;
- Environmental Monitoring System;
- Doppler Weather Radar Network;
- Lightning Location Network;
- Upper Air Sounding Network;
- Surface Hydrological and Meteorological Observation Network;
- Associated Analysis and Forecasting Systems; and
- Ancillary Systems and Works.

These systems will form the heart of an integrated Croatian National Monitoring, Nowcasting and Forecasting system, supported by the suitable information and communication system, which will provide timely alerts and warnings to the population, government and industry of the country. MHS will be better able to support its sister meteorological and hydrological agencies in the region, as is envisioned with the establishment of regional center of excellence (e.g. Regional Marine Meteorological Center).



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Figure 1 Croatia's Meteorological Monitoring Network

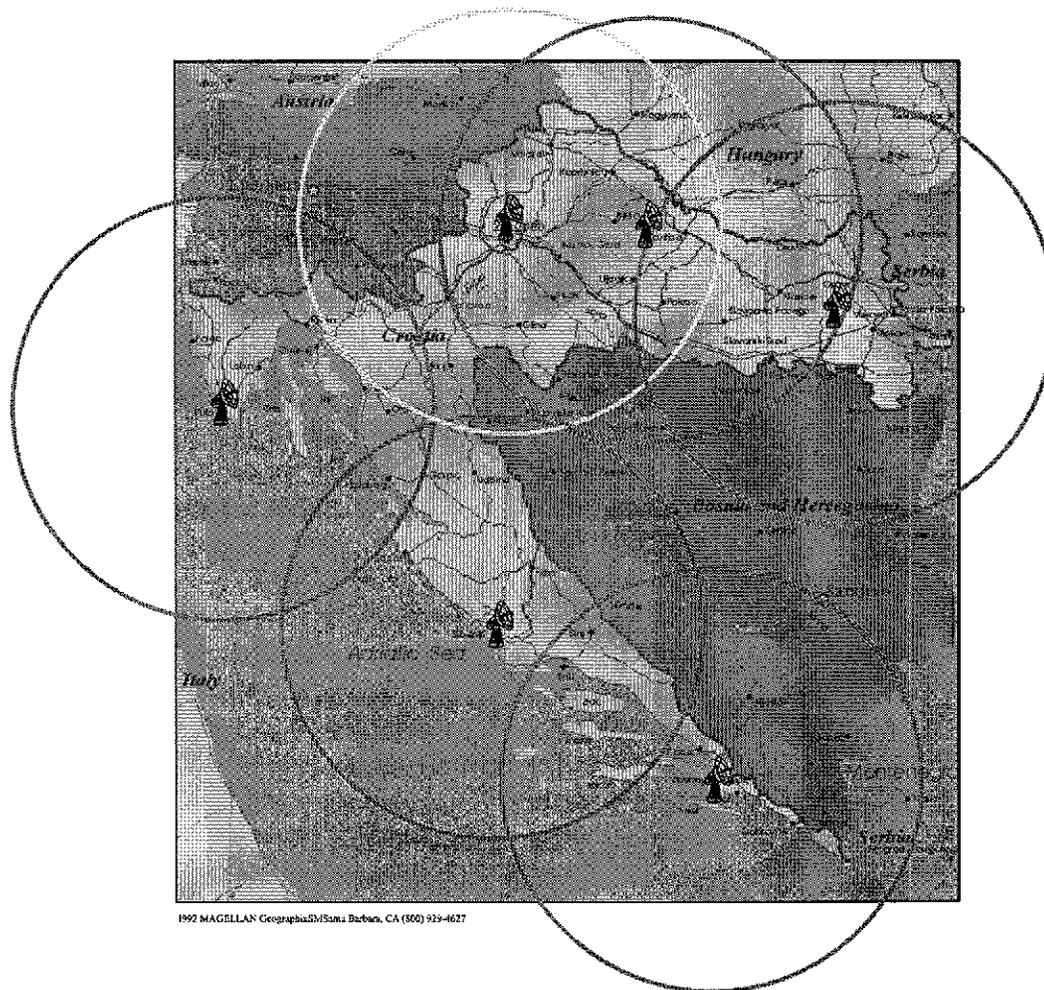




Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Figure 2 Croatia's Existing and Proposed Weather Radar Network

(Stations along the Adriatic Sea are proposed)





Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

C. Project Sponsor's Capability and Commitment

The Meteorological and Hydrological Service of Croatia is involved in all meteorological, hydrological, air quality and climate related activities in Croatia where its expertise is needed. MHS is responsible for international work, cooperation and implementation of work and activities under the Framework Convention on Climate Change, and Vienna Convention on the protection of the ozone layer.

In 2005 MHS had a budget of about €10 million with one third obtained from the commercial activities. MHS has 420 employees. The MHS manages 65 automatic weather stations, two radio sounding stations (Zagreb and Zadar), three Doppler weather radars, 474 (40 main, 117 ordinary, and 317 rain) gage stations, 23 totalizers and one sodar with wind sounding reachable up to one kilometer above ground.

Upgrading of MHS infrastructure has begun including:

- A cost effectiveness study of MHS by the Finish Governmental agency VTT;
- A liaison with the National Electricity Company for the establishment of the lightning monitoring system;
- A network of the additional air quality observation (about 10 new stations) is under consideration as well as the upgrade and filling the gaps of hydrological network. MHS is also under the process of the Vaisala radiosounding systems upgrade; and
- A significant contribution toward running of the nonhydrostatic ALADIN Model in Croatia was provided by the Norwegian Government by a donation of 150 thousand Euros through the WMO Voluntary Co-operation Programme for the upgrade of the computer resources.

The MHS is very active in issuing meteorological and hydrological information in media (internet, newspapers, mobile phone, radio and television including TV weather presentation at the national television by the NMH forecasters). The new version of the TriVis Graphic software has been implemented for TV presentation, newspapers and internet. A good working relationship with the largest private TV companies (RTL Hrvatska and TV Nova) and more than 30 radio stations has been established based on credibility.

Croatia successfully hosted the 2005 *EUMETSAT Conference* held in Dubrovnik in September 2005 and the *Conference on Alpine Meteorology and the Annual Scientific Meeting of the Mesoscale Alpine Programme (ICAM/MAP 2005)*, held in Zadar in May 2005. MHS also participated in the NATO Advanced Research Workshop on the “*Atmospheric planetary boundary layers (PBLs)*” held in Dubrovnik in April 2006.

MHS representatives participated in the cooperation with WMO, EUMETSAT, ECMWF, as well as within GEO, ALADIN, RC LACE, MEDEX, GCOS, OPERA, EMEP etc. After the GCOS workshop in Ljubljana, and with financial support of EUMETSAT, Zagreb was recognized as a subregional GCOS Training Centre on the Use of Satellite Data in Climate Monitoring. Based on a request by MHS, the EUMETNET Council has



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agreed to accept Croatia as an Observer at Council meetings until it became a full Member. MHS has completed all the required technical preparation for the full membership of EUMETSAT with final ratification by Parliament in December 2006 and full membership beginning January 2007.

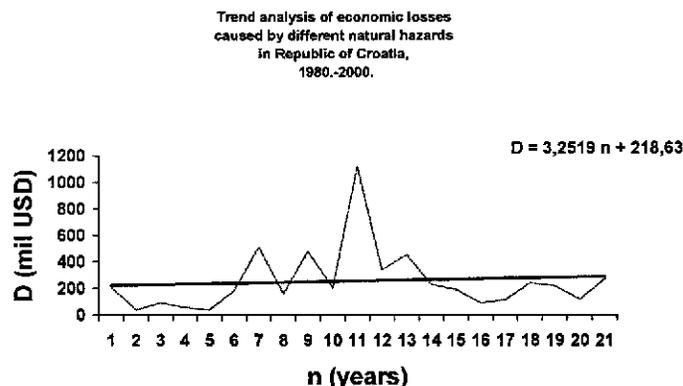
MHS representatives also participated in the EUMeTrain and CONEX II (continuation of the “CEI Nowcasting System”) projects. They are continuing participation in the WMO Sava River Project and looking forward for the closer cooperation with the Sava River Commission.

MHS is active in multilateral and bilateral subregional activities. Together with partners, the process to utilize the results of bilateral meetings by Croatia with Slovenia, Hungary, Macedonia and Bosnia & Herzegovina, in strengthening the cooperation in weather and hydrological warnings as well as in data and knowledge exchange is underway. MHS has received assistance from Slovenia in beginning the quality management (ISO standards) process for MHS.

Incentives for Implementation: There are a number of factors favorable for the implementation of this Project. Foremost is the economic losses caused by natural hazards in Croatia exceed \$218 million per year and are increasing. There is a strong economic incentive to reduce this impact. In addition tourism, shipping, and transportation will benefit from improved forecasting stimulating economic activity within the country. The trend analysis of damages caused by natural hazards in Croatia (Figure 3) corresponds to global trend analyses, showing a slight increase during the two decade period (1980-2000).

Barriers to Implementation: On the other hand, some barriers to implementation exist. The most troublesome being the impact on MHS’ budget and operations of the current national hail monitoring and suppression program. MHS is working to have operational suppression activities taken over by local governments, while MHS focuses on improving Nowcasts and Forecasts of the convective weather which generates the hail.

Figure 3 Loss Trend Analysis





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Legal Regulatory Framework: MHS is a governmental institution falling under the Science Ministry established by the Government of the Republic of Croatia as the central state institution for meteorology, hydrology, climatology, and air quality. It provides expert services to state administration bodies and the public, as described in the Law on MHS services in Croatia (Official Gazette No. 14, 1978). In general, MHS is responsible for:

- Monitoring meteorological, hydrological and biometeorological parameters and phenomena; special measurements of radiation, atmospheric electricity, radioactivity, air and precipitation pollution as well as fresh water and sea pollution, upper air soundings; maintenance, calibration and development of monitoring systems and instruments (in accreditation process);
- Data management, archiving and dissemination of data, products and information;
- Analysis and forecast of atmospheric conditions and phenomena; climate change and related phenomena;
- Transport and deposition of air pollutants; severe weather forecasts and emergency response activities;
- Analysis, research and development of meteorological products and services for the public, governmental bodies and specific users;
- National and international exchange of data and information; and
- International cooperation in the field of meteorology, hydrology and air pollution.

Project Cost Estimate: The estimated capital expenditures required under the plan will be on the order of U.S. \$47 million, including funds for the modernization of MHS' office facilities, technical training and long-term human resource development. Further details on the potential scope of the Project deliverables are provided in the U.S. Export Potential section of this document.

D. Implementation Financing

In order to obtain financing, MHS must submit a strategic plan to the Ministry of Finance through the Ministry of Science. The proposed Feasibility Study will serve as the basis of this plan. Once the strategic plan is approved the annual spending will be approved based on the plan. The Ministry of Finance indicated that MHS strategic plan is likely to gain approval as it is has positive support by many of the most important ministries thus making financing probable.

A United States Export-Import Bank (ExIm Bank) financing request is in preparation by MHS. Discussions with ExIm Bank indicated that they have a very positive outlook toward financing in Croatia. Since ExIm Bank financed a similar project in Romania, ExIm Bank is familiar with the scope of potential exports enhancing the attractiveness to ExIm Bank.

ExIm Bank will finance the export of all types of goods or services, including commodities; as long as they are not military-related. Major programs of the ExIm Bank are: working capital guarantees that cover 90% of the principal and interest on commercial loans to produce U.S.



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goods or services for export; export credit insurance policies to protect against the political and commercial risks of a foreign buyer defaulting on payment; guarantees of commercial loans to foreign buyers of U.S. goods or services that cover 100% of principal and interest against both political and commercial risks of nonpayment; direct loans that provide foreign buyers with competitive, fixed-rate financing for their purchases from the U.S. In Croatia, ExIm Bank has an exposure of close to \$500 million, and is currently negotiating several private projects.

ExIm Bank is committed to working with the Croatian Bank for Reconstruction and Development (HBOR) to expand support for creditworthy transactions in Croatia to support U.S. exports and jobs while contributing to Croatia's economic and infrastructure development. The ExIm Bank and HBOR signed a Memorandum of Understanding in February 2002, to cooperate in financing the sale of U.S. exports for infrastructure and other projects in Croatia, and to cooperate in financing the sale of U.S. and Croatian goods and services for projects in other countries.

Under an agreement, ExIm Bank and HBOR will work together to identify transactions suitable for support on a risk-sharing basis, in such sectors as energy, port infrastructure, tourism, environmental projects, agriculture, technology, health care and education. Both banks anticipate providing credit, guarantee and insurance products and services. Where appropriate, they will consider participation in long-term financing of transactions structured on a project finance basis, where repayment is based on project revenues. Prior to accepting an application for a preliminary or final commitment for a public sector transaction, or for any insurance or WCGP coverage for a public sector transaction, ExIm Bank requires an indication of host government support for the application.

The World Bank has also expressed in discussions an interest in financially supporting the Project as part of a greater regional program. Since Croatia joined the World Bank in 1993, World Bank commitments to Croatia have totaled \$1.2 billion. The range of projects includes: Istria Water Supply/Sewage, Emergency Reconstruction, Highway Sector Project, Farmer Support Services, Emergency Transport/Mine Clearing, Coastal Forest Reconstruction, and Reconstruction Project for Eastern Slavonija. Other projects include: Municipal Environmental Infrastructure Project, Railway Modernization and Restructuring and the Rijeka Gateway Project.

The European Bank for Reconstruction and Development (EBRD) in discussions with Enviromation indicated willingness to work with MHS in supporting its commercial (privatized) activities.

The Overseas Private Insurance Corporation's (OPIC) three main activities are risk insurance, project finance and investment funds. OPIC financing through the investment guaranty program and the direct loan program is limited to \$200 million. OPIC sponsored equity funds make their own, commercially-based investment decisions while fulfilling OPIC's policy mandates. The



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most important fund for the region is the \$150 million Southeast Europe Equity Fund (SEEF) managed by Soros Private Funds Management.

The most likely financing institutions are the U.S. ExIm, the World Bank, and EBRD. However there is widespread financing of projects in Croatia:

- SEEF, an OPIC initiative, was organized to accelerate private sector investment in the Southeast Europe region. SEEF makes direct equity and equity-related investments in attractive privately-owned or privately-managed companies operating in nine countries and territories in the region (Albania, Bulgaria, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Romania, Slovenia and Turkey). The total capital of the fund is \$150 million, including a \$100 million loan commitment from OPIC.
- International Finance Corporation (IFC), a member of the World Bank Group, offers a full array of financial products and services to companies in its developing member countries: long-term loans, equity investments, quasi-equity instruments (subordinated loans, preferred stock, income notes), guarantees and standby financing, and risk management (intermediation of currency and interest rate swaps, provision of hedging facilities). In Croatia, IFC has committed to eight projects with total financing of \$123 million equivalent.
- The European Bank for Reconstruction and Development (EBRD) assists 27 countries including Croatia to implement structural and sectoral economic reforms, promoting competition, privatization and entrepreneurship, taking into account the particular needs of countries at different stages of transition. In Croatia the EBRD has approved Euro 961 million of loans, Euro 216 million of equity, and Euro 34 million of guarantees.
- The Croatian Bank for Reconstruction and Development (HBOR): HBOR is a state-owned development bank, founded in 1992 by a resolution of the Parliament of the Republic of Croatia to facilitate the State's policies on the reconstruction and development of the Croatian economy in particular shipbuilding, development of the tourist industry, credit financing for development projects, and construction and rebuilding of housing, infrastructure financing, as well as the financing and insuring of export transactions. In addition to the state capital contribution of HRK 3.7 billion, HBOR seeks alternative funding from international capital markets as well as from special financial institutions such as EBRD, IBRD, CEB, EIB and KfW. HBOR obtained an investment grade credit rating from Standard & Poor's (BBB-) and Moody's (Baa3) in line with the sovereign ceiling, based on the sound banking operations and strong institutional support from the Croatian Government.

E. U.S. Export Potential

MHS has a long-standing relationship with leading American suppliers of weather (water) monitoring and forecasting technologies now available in the United States. The support of the



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

USTDA to this Project could be fully justified by the significant export sales opportunities for U.S. manufacturers which the Project reflects. MHS expects that the import component will be approximately 80% of the final contract value representing nearly \$38 million in potential exports from the United States.

Figure 4 Export Potential and Project Cost

<i>Subsystem</i>	<i>Quantity</i>	<i>Cost Estimate</i>	<i>U.S. Companies</i>
Doppler Weather Radar Network (DWRN) and Doppler Weather Radar Upgrade	4	\$9,000,000	EEC, ADC, Sigmat, Radtec
Lightning Detection Network (LDN)	5	\$1,500,000	Boltek, United States Precision Lightning Network, TOA Systems, Inc.
Automatic Weather Stations Network (AWS) Upgrade	50	\$1,500,000	Campbell Scientific, Coastal Environmental, MET ONE, Vaisala*
Classical Weather Stations Network Upgrade (CWSN)	34	\$1,000,000	Campbell Scientific, Coastal Environmental, MET ONE, Vaisala*
Automatic Rain Gauges Network	150	\$1,000,000	Sutron, Stevens Water, NovaLynx, Design Analysis, High Sierra Electronics, Campbell
A Network of Automatic Hydrological Stations (AHSN) Upgrade and Expansion	300	\$3,000,000	Sutron, Stevens Water, NovaLynx, Design Analysis, High Sierra Electronics, Campbell, MET ONE
A Network of Buoys	8	\$1,800,000	Sutron, Coastal Environmental, Sippican, Internet, Vaisala*
Upgrade and Expansion of the Upper Air Sounding Network	1	\$750,000	Sutron, Coastal Environmental, Sippican, Internet, Vaisala*
Calibration Laboratory Upgrade and Expansion	1	\$1,000,000	Equipment Suppliers
Wind Profiling Radar Network (WPRN)	3	\$1,400,000	Lockheed Martin, ATRAD, Vaisala, DEGREANE
Microwave Profiling Radiometer Network (MPRN)	3	\$750,000	Radiometrics
Nowcasting System	1	\$1,250,000	Weather Decision Technologies
Numerical Modeling Center	1	\$3,500,000	Motorola, Lockheed Martin, Raytheon
Forecaster Workstation Network	1	\$1,650,000	Motorola, Lockheed Martin, Raytheon



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Forecast Distribution System	1	\$1,000,000	Motorola, Lockheed Martin, Raytheon
Communications Network Upgrade and Modernization	1	\$2,000,000	Verizon, Intrado, Plant, Nortel, Avaya, Motorola, MA Comm
Computer System and Peripherals	1	\$8,000,000	Cisco, Dell, Microsoft, HP, IBM
Data Base and Implementation	1	\$3,000,000	Motorola, Lockheed Martin, Raytheon
Training Services	1	\$2,000,000	Motorola, Lockheed Martin, Raytheon
Facilities Improvement	1	\$2,000,000	Motorola, Lockheed Martin, Raytheon
Total Cost		\$47,100,000	
Export Potential		80%	
U.S. Potential Exports		\$37,700,000	

F. Foreign Competition and Market Entry Issues

U.S. equipment and service suppliers are expected to meet strong competition from global suppliers. European firms have an advantage due to geographical proximity and historical trade patterns. European manufacturers such as Vaisala and Gematronik have a significant presence in the region for infrastructure hardware and software. These firms have excellent reputations and consistently compete with U.S. firms in this region. Local industry capabilities are limited in services and software and some hardware equipment areas.

Figure 5 Foreign Competition

Foreign Competition	
<i>Country</i>	<i>Company</i>
Finland	Vaisala
France	Thomson
France	MODEM
Germany	Lambrecht
Germany	Gematronik
Germany	GRAW
Japan	Meisei
Switzerland	Meteolbor

G. Development Impacts

Infrastructure: This Project will form the heart of an integrated Croatian National Monitoring, Nowcasting and Forecasting system, supported by the suitable information and communication



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

system, which will provide timely Alerts and Warnings to the Population, Government and Industry of the country.

Market-Oriented Reform: The implementation of this Project will allow MHS to move ahead with requests to the government to permit privatization and commercialization of selected activities to be user focused that will enhance tourism, shipping, agriculture, and other weather dependent activities. If activities were privatized they would include customer specific forecasts such as specific weather information for wine production rather than hydro-meteorological services provided to the public as a national service. At present Croatian Law does not permit weather services to be provided by private companies but initiatives are underway by other companies to change this law. This Project will reinforce these on-going efforts.

Human Capacity Building: The implementation of this program will require retraining throughout the 420 person organization. Of the 420 people only 50 are engineers and scientists. At present the majority of personnel are semi-skilled field observers. With automation the need for these skills will be reduced and the need for skilled resources increased. As a result of implementing this Project greater efficiencies can be achieved requiring fewer field personnel and more engineers and scientists. As a result high skilled jobs are created and a greater level of professionalism will be achieved.

Technology Transfer and Productivity Enhancement: Advanced forecasting and prediction technologies will be transferred as part of this program permitting real time forecasts instead of only daily forecasts.

Other: Accurate weather and flood forecasting is especially important for Croatia because of its strategic location on the Balkan Peninsula and its extended coastline on the Adriatic Sea which is well known for the rapid onset of very dangerous weather conditions, and the mountainous terrain which exacerbates flooding conditions. The country suffers severe economic damage every year from severe thunderstorm conditions and winter storms, which currently are not sufficiently managed as a result of the lack of appropriate operational monitoring, warning and forecasting systems. Preparation of a precise sector analysis of weather, environment and flooding related losses is a key issue of the proposed feasibility study.

During the two decade period (1980-2000), the greatest economic losses in Croatia due to natural hazards were caused by: droughts (38%), severe storms and hail (20 %), earthquakes (12%) wild fires (7%), floods (7%) and frost (8%) as shown on Figure 6.

H. Impact on the Environment

This Project will have a positive impact on the environment. An integrated meteorological and hydrological forecasting and warning system is expected to reduce response times and improve



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

effectiveness and coordination of response to weather induced environmental disturbances and floods thereby reducing their potential impact on the environment. No negative impacts on the environment of significance have been identified. It is anticipated that the current hydro-meteorological equipment locations will be largely utilized in this Project. However if additional communications towers or underground cables are required some environmental impact will occur though limited in nature. The radar units are expected to be placed on military facilities, for security reasons, where any environmental impact are contained and do not affect the public as a whole. These impacts are typically resolved during the permitting process for the relevant construction.

Figure 6 Economic losses from natural hazards in Republic of Croatia (\$U.S.)

Year	Drought	Hail	Earthquake	Fire	Floods	Frost	Other	Multiple	Total
1980	0	0	0	0	0	0	0	209,956	209,956*
1981	0	7,584	9,832	0	0	21,348	0	0	38,764
1982	0	15,784	60,405	0	15,004	0	1,169	0	92,362
1983	6,764	18,626	0	31,634	312	0	208	0	57,544
1984	1,967	13,388	2,475	634	16,244	127	4,124	0	38,959
1985	16,907	652	0	44,711	0	90,580	29,396	0	182,246
1986	0	131,482	350,775	5,759	0	17,743	6,560	0	512,319
1987	0	116,169	0	21,553	0	22,884	0	0	160,606
1988	323,845	4,054	0	20,865	682	128,193	79	0	477,718
1989	0	26,625	13,425	23,475	138,390	588	0	0	202,503
1990	849,488	12,878	186,540	62,548	9,043	0	0	0	1,120,497
1991	0	243,005	0	0	8,735	50,214	5,078	33,111	340,143
1992	346,307	41,770	0	0	0	0	0	63,968	452,045
1993	126,624	20,285	0	22,542	40,897	0	15,010	0	225,358
1994	101,061	49,248	0	2,356	30,381	0	6,934	0	189,980
1995	1,599	37,357	0	38,235	7,051	2,043	2,702	0	88,987
1996	3,284	34,646	21,086	25,420	23,911	0	244	4,613	113,204
1997	1,180	83,969	0	29,240	13,001	97,737	48	13,742	238,917
1998	9,760	114,650	0	34,684	38,233	3,672	16,358	0	217,357
1999	0	65,324	0	670	50,220	0	0	0	116,214
2000	223,147	15,287	0	8,785	1,581	0	17,855	0	266,655
Total	2,011,933	1,052,783	644,538	373,111	393,685	435,129	105,765	325,390	5,342,334
%	38	20	12	7	7	8	2	6	100

* For year 1980 available only total amount of all losses

I. Impact on U.S. Labor

This Project is expected to have a positive impact on U.S. labor if implemented. The software, computer hardware, and systems integration industries will see a beneficial effect. In these industries, the United States has a strong position and the jobs in this high tech arena are among the best paid in the United States. There are no legislative prohibitions on the use of the funds proposed.



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J. Qualifications

The key personnel must have experience with integrated meteorological and hydrological systems design, planning, and implementation. The Contractor must demonstrate project qualifications for integrated meteorological and hydrological systems including planning, design, and implementation experience to include areas such as technology, operations, personnel, budgeting, facilities, and organizational issues (60%). This experience must include all of the following:

- Assessing, developing, designing, and implementing automated weather and environmental monitoring systems including but not limited to:
 - o Surface hydrological and meteorological observation equipment and systems;
 - o Hydro-met warning equipment and systems;
 - o Doppler weather radar equipment and networks;
 - o Upper air sounding equipment and networks;
 - o Environmental monitoring equipment and networks (global climate change, air pollution, acid rain, surface ozone);
 - o Lightning detection and location equipment and networks;
 - o Analysis and forecasting technology and systems;
 - o Sona-buoy equipment and networks; and
 - o Computer resources and data base construction.
- Developing and implementing integrated processing of hydro-meteorological data and forecast distribution systems.
- Implementing technology supporting real-time situational analysis, decisions, and economic returns analysis.

Experience in Eastern European meteorological and hydrological management legislation, systems, operations and the Eastern European governments' organizational structure of management of this area is required (10%). The Contractor must be familiar with Eastern European, European Union (EU) and North Atlantic Treaty Organization (NATO) crisis management laws, regulations, systems and operational procedures (10%). The Contractor must demonstrate knowledge and experience in financing similar systems (20%).

K. Justification

Improved warning capabilities derived from this Project will be of great benefit to Croatia, its citizens and to the countries in the region. The execution of the proposed Feasibility Study funded will assure that leading United States manufacturers and suppliers of high technology meteorological and hydrological technologies and integrating software systems will be in a favorable position for supplying equipment to MHS as the Project goes forward. The total American exports to be expected are in the range of \$38 million



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Significant economic benefits, referred to as “Recoverable Losses”, are to be gained by more accurately forecasting such severe weather events. Improved warnings and rapid location of significant weather and forecasting of severe rainfall events can save lives and property. Expansion of the oceanographic network and improved data analysis and processing will improve the safety of marine traffic (commercial and nautical tourism) in the Adriatic, and the productivity of Croatia’s fishing and industry. Additional benefits to the population include reductions in loss of life and property, improved disaster management, and enhanced functioning of the nation’s telecommunications and power-generation/distribution infrastructure.

A quick perusal of the map of Croatia makes clear that it is strategically positioned in the southeastern Europe, meaning that the impact of the MHS Modernization Project will have very far-reaching and positive impact on MHS’ sister agencies in Bosnia-Herzegovina, Serbia and Montenegro, as well as in other neighboring states. This Project when completed will clearly establish MHS’ leadership role in the region and will open new opportunities for the sale of similar systems among Croatia’s neighbors.

L. Terms of Reference

Aim of the Terms of Reference: The comprehensive hydro-meteorological forecast and warning network of MHS will be optimized to provide effective short-term Nowcasts (0-6 hours), short-term Forecasts (6-72 hours), and longer of all severe hydrological, meteorological and environmental conditions which threaten life and property in the Republic of Croatia. The optimization will also support analysis of air pollution conditions, and the effective forecasting the onset and dispersion of pollution events.

Based on preliminary studies by MHS, the main beneficiaries of MHS’ improved forecasting capabilities will be in the following sectors:

- Weather and Flood Hazard Warning and Management;
- Environmental Protection;
- Maritime, Surface and Air Transportation;
- Agriculture;
- Water Resource Management;
- Tourism and Nautical Tourism;
- Media;
- Forestry Management and Conservation;
- Electric Power Generation and Transmission; and
- Renewable Energy Projects;

Outline of the Terms of Reference: The Terms of Reference (TOR) are presented as a series of tasks that form a systematic analysis of the modernization and expansion requirements of the capabilities of Meteorological and Hydrological Service of the Republic of Croatia. The tasks are summarized as:



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- Task 1: Kickoff Meeting
 - 1.1: Initial Meeting and Scoping Process
 - 1.2: Evaluation of Existing Infrastructure
- Task 2: Needs Assessment
 - 2.1: Surface Hydrological and Meteorological Observation System
 - 2.2: Hydromet Warning System
 - 2.3: Doppler Weather Radar Network
 - 2.4: Upper Air Sounding Network
 - 2.5: Environmental Monitoring Network (Global Climate Change, Air Pollution, Acid Rain, Surface Ozone)
 - 2.6: Lightning Detection and Location Network
 - 2.7: Analysis and Forecasting Systems
 - 2.8: Computer Resources and Data Base
 - 2.9: Ancillary Systems and Works
 - 2.10: Needs Assessment Report
- Task 3: Implementation and Financing Plan
- Task 4: Human Resources Development and Training Plan
- Task 5: Cost/Benefit Analysis
- Task 6: Conduct Regulatory and Environmental Review
- Task 7: Development Impact Assessment
- Task 8: Final Report

Terms of Reference: The Feasibility Study (Study) will carefully analyze and quantify the impacts on the sectors of improved forecasts in order to optimize the overall Hydrological and Meteorological System Modernization Plan to satisfy the broadest range of needs with greatest positive effect. An end-result of the study will be the development of an Integrated National Operational Concept for the Meteorological & Hydrological Advanced Monitoring and Forecasting system envisioned herein, and a detailed plan for its implementation. The Study shall be carried out using a structured systems approach which evaluates development of a complete modernization plan for MHS hydrology and meteorology forecasting and monitoring systems.

Task 1: Kickoff Meeting

Task 1.1: Initial Meeting and Scoping Process: The Contractor shall meet with the Meteorological and Hydrological Service (MHS) in Zagreb to launch the Project. During this meeting the Project's initial work plan shall be reviewed, along with expectations of the



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Study goals, objectives, desired outcome, and reporting formats (Contractor to MHS) of the Project.

During this meeting, the Contractor shall conduct one-on-one meetings with relevant Centers such as, but not limited to:

- Drought;
- Hydrology;
- Agriculture;
- Numerical Modeling;
- Air Pollution;
- Remote Sensing;
- Instrumentation;
- Calibration Center;
- Information Technology; and
- Global Climate Observing System.

The purpose of this task is to clarify the Study scope of work, if required, and to identify the MHS staff that should be involved with the Study. Establishment of expectations for MHS staff involvement and participation in the planning process is also to be completed. MHS is expected to have a high degree of involvement in the planning of the modernization and expansion process.

The Contractor shall become systematically involved with MHS in all aspects of the planning for this modernization and expansion process. This includes the technology application and transfer, project implementation, logistics support, development of training and maintenance plans associated with the initial implementation of the Project. The planning process shall be closely developed with MHS which shall enhance the likelihood of a satisfactory and acceptable outcome.

Task 1.2: Evaluation of Existing Infrastructure: The Contractor shall gather data and document the existing system in detail. The Contractor shall analyze all elements of the existing infrastructure, including, but not limited to:

- Existing Surface Hydrological and Meteorological Observation Network;
- Hydrometeorological Alert and Warning System;
- Environmental Monitoring System (Climate change, Air Pollution, Acid Rain);
- Radar Weather Network;
- Upper Air Sounding Network;
- Weather Models (ALADIN), and Forecast Systems;
- Database and Data Processing Capabilities; and
- Human Resources.



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Task 2: Needs Assessment: The Contractor shall not only evaluate the needs of MHS in each technology category listed below but also identify how that need is best resolved and its associated costs.

Task 2.1: Surface Hydrological and Meteorological Observation System: MHS operates approximately 400 surface hydrological and meteorological platforms. Most of these platforms are operated manually. The Contractor shall develop the design to automate these stations and upgrade the sensor packages. The surface network shall be evaluated by the Contractor as to the suitability of the existing network coverage. The Contractor shall provide recommendations for the addition or subtraction of stations that shall provide efficient coverage of weather event shall be made based on the needs of river modeling as well as surface synoptic observations.

The assessment of the surface monitoring and real-time reporting network shall include an assessment of telemetry options that shall allow the real-time reception of surface data to not only MHS, but to any members of the World Meteorological Organization (WMO). Open data distribution systems such as European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), which is provided at no charge to MHS, shall be preferentially considered. Telemetry systems shall be tolerant to natural disasters (i.e. floods, earthquakes, public emergencies) and preferably be on a communication path designed for emergency response (i.e. telemetry such as the Global System for Mobile communication (GSM) networks that are shared with the general public is not desirable). The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.2: Hydromet Warning System: The Contractor shall design a hydro-meteorological warning system capable of real time event warning based on the real-time data network, including the following subsystems:

- Surface Hydrological and Meteorological Observation Network;
- Lightning Detection/Location Network; and
- Doppler Weather Radar Network.

The hydromet warning system shall incorporate all aspects of extreme rainfall and high water situations. The warning system shall include a method to automatically receive and incorporate hydro-met data, river and weather forecasts, remote sensing observations into a flood warning application. The warning system shall provide automated dissemination of extreme weather events leading to flooding, or the potential for flooding. The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.3: Doppler Weather Radar Network: The existing radar network is comprised of three radars. The Contractor shall develop Doppler weather radar surveillance design covering the Adriatic Sea west of Croatia to provide lead-time and confirmation significant



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weather events of three more radars along the coast of the Adriatic Sea to monitor oncoming weather events. The modernization Project shall also consider the feasibility of upgrading the two existing radars. The Contractor shall work closely with MHS in defining the requirements for improved radar surveillance. The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.4: Upper Air Sounding Network: The upper air sounding network includes two upper air locations. One upper air station is fully automated, capable of operating continuously for one week; the other upper air station is manual. The Contractor shall prepare a modernization plan for the upper air sounding network including the upgrade of the manual station to be automated with a minimum operation of one week (twice a day sounding). The Contractor shall also evaluate MHS' requirements for wind profilers and microwave radiometers. The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.5: Environmental Monitoring Network (Global Climate Change, Air Pollution, Acid Rain, Surface Ozone): The Contractor shall evaluate the environmental monitoring network. The existing network monitors air pollution and precipitation chemistry (such as acid rain). Monitoring shall meet both European Union (EU) directives as well as WMO standards. The environmental requirements shall be discussed in greater detail with MHS. The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.6: Lightning Detection and Location Network: The Contractor shall develop the design of a lightning detection/location network adequate to support an early warning system of hazardous weather conditions as related to hail, flood, fire, and power generation/distribution for interested industries. Potential customers of this information feed shall be identified in a study that shall establish the Return on Investment of this equipment. MHS is already in the preliminary phases of developing a Lightning Detection and Location Network which MHS will provide to the Contractor for guidance. The Contractor shall develop the cost of implementation and a standalone implementation plan of this task for use in Task 3.

Task 2.7: Analysis and Forecasting Systems: MHS runs a variety of models, including Aire Limitée Adaptation dynamique Développement InterNational (ALADIN) and MM5 real time weather forecasting system for both hydrostatic and non-hydrostatic conditions. There is intent to incorporate the AROME weather forecasting model in the future. The Contractor shall study the performance of the models in use by MHS, and provide recommendations to MHS on which models perform best and help MHS in providing improved forecasts for the operational needs of MHS. This effort shall include close cooperation and a close working relationship with ongoing MHS efforts. The Contractor shall evaluate its findings as two sub-sections: 1. Numerical Weather Prediction and 2. Meteorological Analysis and Display workstations.



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MHS desires to automate forecast product generation and distribution, including model output and flood forecasts. The Contractor shall evaluate existing flood forecast and water supply tools and provide recommendations on the most effective tools available to improve water and weather management forecasts. The Contractor shall consider not only models but the necessary network of information required to support the model. The Contractor shall also consider an optimum surface monitoring network to feed the models.

In the event a suite of improved models are suggested, the necessary computational resources shall be part of this study. It shall be assumed that any additional computational needs shall be matched with the addition of extra equipment. The Contractor shall assess the total model needs in developing a strategy to supply the computer resources. The cost of implementation and a standalone implementation plan of this task are required for use in Task 3.

Task 2.8: Computer Resources and Data Base: MHS uses a flat file data base for the storage of most of its meteorological data. The Contractor shall evaluate the data base needs of MHS and recommend a new data base and implementation plan. MHS would like open source solutions to be sought, which shall reduce the strain of licenses through the life of the data base. MHS is aware of the move to PostGreSQL in the United States by the National Weather Service. The Contractor shall evaluate the applicability of PostGreSQL to the proposed Project. The Contractor shall develop the cost of implementation and a standalone implementation plan of this task for use in Task 3.

The Contractor shall evaluate the existing computer resources and the expected requirements if the modernization and expansion were to be fully engaged. The Contractor shall evaluate the need for a supercomputer and make a recommendation.

Task 2.9: Ancillary Systems and Works: Backup of critical systems and archiving data on media such as automatic tape storage is required to fully implement the Project. The Contractor shall evaluate the storage requirements of MHS and the impact of the Project. MHS shall be consulted with to assure their needs are reflected in the evaluation of all data storage requirements. The deliverable of this task shall include a detailed layout of mass storage and how it shall be integrated into existing as well as recommended computer resources. The Contractor shall consider the cost and location of backup systems to provide suitable protection of the data and a standalone implementation plan for use in Task 3.

Task 2.10: Needs Assessment Report: The Contractor shall prepare a report that identifies the needs of MHS by technology, the assessment methodology employed, the recommended method to evaluate those needs, the cost of the resolution, and the priority of each technology resolution. This report shall be reviewed with MHS and shall be suitable for use as a guide by other national MHSs in assessing modernization of their system(s).



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Task 3: Implementation Plan: The Contractor shall prepare a complete implementation plan for each of the stated needs that integrate the recommended resolutions and the standalone implementation plans as defined by a Task 2 of this Study.

The implementation plan shall consider financing requirements in the plan and identify the most likely financing source(s). When identifying financing sources, the Contractor shall:

- Investigate the Croatian Government's willingness to extend a sovereign guarantee to lenders which could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness from the viewpoint of international lenders;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Obtain indicative term sheets from potential lenders; and
- Develop a financing plan taking into account the comments and requirements of the above-mentioned institutions. The financing plan shall include indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

In addition to the cost of equipment and services, the implementation plan shall consider methods of managing financing costs, interest rates, equity requirements, repayment terms, etc. that are required as inputs for the cost/benefit analysis in Task 5. This report shall be reviewed with and approved by MHS and shall be suitable for use as a guide by other national MHSs in assessing modernization of their system(s).

Task 4: Human Resources Development and Training Plan: The Contractor shall develop a plan for initial and on-going training for the proposed modernization and expansion program consistent with the implementation plan. The plan shall consider MHS' needs for a training center. The training program shall consider distance learning, as well as learning modules that can provide a consistent approach to learning. A training plan shall be prepared by the Contractor which shall be reviewed with and approved by MHS.

Task 5: Cost/Benefit Analysis: In order to justify the modernization and expansion program there the Contractor shall prepare a comprehensive cost/benefit analysis consistent with the Implementation Plan. The Contractor's analysis shall compare the cost of the various losses associated with existing capabilities, with reduced losses incurred with the modernization and expansion program. In this task the Contractor shall in addition to the cost of equipment and services, include financing costs, interest rates, equity requirements, repayment terms, etc. that were developed in Task 3 in the cost/benefit analysis.. The Contractor shall prepare a cost/benefit analysis report with implantation recommendations. This report shall be reviewed with and approved by MHS.



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Task 6: Conduct Regulatory and Environmental Review. Based on the proposed conceptual system, the Contractor shall assess Croatian law and EU regulations. The proposed Project design and implementation shall comply with existing Croatian and EU laws and regulations. The Contractor shall identify laws and regulations that, if modified, would enable more effective local and national implementation.

The Contractor shall complete an overview environmental assessment of the proposed Project consistent with EU and Croatian standards as well as those of financing institutions such as the World Bank or the European Bank for Reconstruction and Development (EBRD). In addition, the Contractor shall identify significant mitigation measures and associated costs (within +/- 20%) required, if any, to meet the applicable guidelines and regulations and include the costs into Task 5 above.

Task 7: Development Impact Assessment: The Contractor shall evaluate the development impacts associated with the Project. These impacts include:

1. An estimate of the Project's potential benefits in the following tasks:
 - Prepare a statement on the infrastructure impact giving a brief synopsis.
 - Describe any regulations, laws or institutional changes that are recommended and the effect they would have if implemented.
 - Evaluate the number and type of positions that would be needed to construct and operate the proposed Project as well as the number of people who will receive training.
 - Describe any advanced technologies that will be implemented as a result of the Project.
 - Identify any other development benefits to the Project including any spin-off or demonstration effects.
2. Preparation of a statement on the impact on U.S. labor in accordance with USTDA guidelines.

Task 8: Final Report: The Consultant shall prepare a Final Report in the report format that is required in accordance with Clause I of Annex II of the Grant Agreement. In addition, the Contractor shall identify prospective U.S. Sources of Supply in accordance with Clause I of Annex II of the Grant Agreement. The Final Report shall also include a comprehensive and detailed statement of findings and recommendations from Tasks 1-7. The Final Report shall include as a minimum chapters on:

1. Needs Assessment
2. Recommended System Design
3. Implementation Plan
4. Training Plan
5. Cost/Benefit Analysis
6. Conduct Regulatory and Environmental Assessment
7. Development Impact Assessment

Deliverables: The deliverables of the Study are:

1. Needs Assessment Report (Task 2)



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2. Implementation Plan (Task 3)
3. Training Plan (Task 4)
4. Cost/Benefit Analysis Report (Task 5)
5. Final Report (Task 8)

Period of Performance: The estimated period of performance is 52 weeks (12 months) from contract approval.



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M. Study Budget

Figure 7 Budget

BUDGET				
DIRECT LABOR COSTS:				
TOR Task	TOR Task Name	Primary Contractor (Employee) Labor		
	Position	Total Person Days	x Daily Rate	= TOTAL COST
1	Kickoff Meeting			
	Project Manager	5	\$1,216	\$6,080
	Technical Director	5	\$1,140	\$5,700
	Senior Meteorologist	5	\$760	\$3,800
	Senior Hydrologist	5	\$760	\$3,800
	Computer Engineer	5	\$760	\$3,800
	Totals	25		\$23,180
2	Needs Assessment			
	Project Manager	11	\$1,216	\$13,376
	Technical Director	11	\$1,140	\$12,540
	Senior Meteorologist	45	\$760	\$34,200
	Senior Hydrologist	34	\$760	\$25,840
	Scientist/Engineer	80	\$532	\$42,560
	Computer Engineer	35	\$760	\$26,600
	Totals	181		\$155,116
3	Implementation Plan			
	Project Manager	10	\$1,216	\$12,160
	Technical Director	10	\$1,140	\$11,400
	Senior Meteorologist	10	\$760	\$7,600
	Senior Hydrologist	10	\$760	\$7,600
	Scientist/Engineer+E89	20	\$532	\$10,640
	Commercial Specialist	25	\$912	\$22,800
	Totals	85		\$72,200
4	Human Resources Development and On-going Training Program			
	Project Manager	2	\$1,216	\$2,432
	Technical Director	5	\$1,140	\$5,700
	Trainer	30	\$456	\$13,680
	Totals	37		\$21,812
5	Cost/Benefit of Proposed Modernization and Expansion Program			
	Project Manager	10	\$1,216	\$12,160
	Technical Director	5	\$1,140	\$5,700
	Commercial Specialist	30	\$912	\$27,360
	Trainer	1	\$456	\$456
	Totals	45		\$45,676
6	Regulatory and Environmental Review			
	Project Manager	1	\$1,216	\$1,216
	Technical Director	2	\$1,140	\$2,280
	Totals	3		\$3,496



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7	Development Impact Assessment			
	Project Manager	3	\$1,216	\$3,648
	Totals	3		\$3,648
8	Final Report			
	Project Manager	10	\$1,216	\$12,160
	Technical Director	10	\$1,140	\$11,400
	Senior Meteorologist	5	\$760	\$3,800
	Senior Hydrologist	5	\$760	\$3,800
	Scientist/Engineer	20	\$532	\$10,640
	Commercial Specialist	5	\$912	\$4,560
	Trainer	2	\$456	\$912
	Totals	57		\$47,272
	SubTotal Employee	436	\$854	\$372,400

TOR Task TOR Task Name Non-Employee Labor

	Position	Total Person Days	x Daily Rate	= TOTAL COST
1	Kickoff Meeting			
	General Consultant	10	\$640	\$6,400
	Translator	10	\$100	\$1,000
	Totals	20		\$7,400
2	Needs Assessment			
	General Consultant	10	\$640	\$6,400
	Engineer	60	\$228	\$13,680
	Translator	30	\$100	\$3,000
	Totals	100		\$23,080
3	Implementation Plan			
	General Consultant	10	\$640	\$6,400
	Local Engineer	20	\$228	\$4,560
	Translator	10	\$100	\$1,000
	Totals	40		\$11,960
4	Human Resources Development and On-going Training Program			
	General Consultant	2	\$640	\$1,280
	Local Engineer	5	\$228	\$1,140
	Translator	20	\$100	\$2,000
	Totals	27		\$4,420
5	Cost/Benefit of Proposed Modernization and Expansion Program			
	General Consultant	2	\$640	\$1,280
	Local Engineer	5	\$228	\$1,140
	Translator	5	\$100	\$500
	Totals	12		\$2,920



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6	Regulatory and Environmental Review			
	General Consultant	2	\$640	\$1,280
	Attorney	5	\$304	\$1,520
	Totals	2		\$2,800
7	Development Impact Assessment			
	General Consultant	2	\$640	\$1,280
	Totals	2		\$1,280
8	Final Report			
	General Consultant	5	\$640	\$3,200
	Local Engineer	10	\$228	\$2,280
	Translator	10	\$100	\$1,000
	Totals	25		\$6,480
	SubTotal Non-Employee	228	\$265	\$60,340
	TOTAL DIRECT LABOR COSTS			\$432,740

OTHER DIRECT COSTS:

Travel

	Trips	Trip Cost	TOTAL COST
International Air Travel	14	1800	\$25,200
Ground Transportation	14	100	\$1,400
Airport Transport - US	28	90	\$2,520
Airport Transport - Croatia	28	25	\$700
	Trip Days	Per Diem Rate	TOTAL COST
Per Diem	100	223	\$22,300
Other (Local Travel)	100	50	\$5,000
SubTotal Travel			\$57,120

Other

	Quantity	Units	Unit Cost	TOTAL COST
Reproduction and Binding	2000	pages	0.125	\$250
Courier Services	25	packages	18	\$450
Communication	52	weeks	100	\$5,200
SubTotal Other				\$5,900

TOTAL OTHER DIRECT COSTS: \$63,020

TOTAL COST (DIRECT LABOR + OTHER DIRECT COSTS): \$495,760

TOTAL U.S. COMPANY COST SHARE:

PROPOSED USTDA GRANT: \$495,760



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BUDGET NARRATIVE

DIRECT COSTS

Direct Labor

Project Manager– This individual will provide necessary guidance and support to the Project to ensure successful completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project and oversee the completion of the Terms of Reference. The individual that fills this position is required to have 25 years experience in managing meteorology and hydrology projects. It is estimated that 52 days will be required at a daily rate of \$1216. The rate was calculated with a base salary of \$640 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Technical Director - This individual will provide necessary technical guidance and support to the Project to ensure successful completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project and oversee the completion of the Terms of Reference. The individual that fills this position is required to have 20 years technical experience in the design, planning, implementation, and operation of meteorology and hydrology projects. It is estimated that 48 days will be required at a daily rate of \$1140. The rate was calculated with a base salary of \$600 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Senior Meteorologist - This individual will perform the meteorological related tasks associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Technical Director. The individual that fills this position is required to have 15 years as a meteorologist with technical experience in the design, planning, implementation, and operation of meteorology projects. It is estimated that 65 days will be required at a daily rate of \$760. The rate was calculated with a base salary of \$400 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Senior Hydrologist - This individual will perform the hydrological related tasks associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Technical Director. The individual that fills this position is required to have 15 years as a hydrologist with technical experience in the design, planning, implementation, and operation of hydrology projects. It is estimated that 54 days will be required at a daily rate of \$760. The rate was calculated with a base salary of \$400 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Computer Specialist - This individual will perform the information technology and computer related tasks associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Technical Director. The individual that fills this position is required to have 15 years as a hydrologist with technical experience in the design, planning, implementation, and operation of hydrology projects. It is estimated that 40 days will be required at a daily rate of \$760. The rate was calculated with a base salary of \$400 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Scientist/Engineer - This individual will perform the meteorological and meteorological equipment evaluation design and analysis related tasks associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Senior Hydrologist and Meteorologist. The individual that fills this position is required to have 5 years as a hydrologist or meteorologist with technical experience in the design, planning, implementation, and operation of meteorological or hydrological projects. It is estimated that 120 days will be required at a daily rate of \$532. The rate was calculated with a base salary of \$280 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Commercial/Financial Specialist - This individual will perform the financing, economic evaluations, and economic evaluation tasks associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Project Manager. The individual that fills this position is required to have 15 years as an economist, financial specialist, or commercial specialist with expertise in evaluating and financing projects in Southeast Europe. It is estimated that 30 days will be required at a daily rate of \$912. The rate was calculated with a base salary of \$480 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Trainer - This individual will assess the needs for training and develop the training program associated with the completion of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia Project working under the guidance of the Technical Director and Project Manager. The individual that fills this position is required to have 15 years as a professional trainer with expertise in technical training in Southeast European countries and working with translators. It is estimated that 32 days will be required at a daily rate of \$456. The rate was calculated with a base salary of \$240 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Other Direct Labor

General Consultant -This individual will develop provide an understanding of the Croatian Hydrological and Meteorological network, European and Croatian laws and practices, and an understanding of regional issues. He will also direct the in-country data gathering from local participants and officials for the design and implementation plan under the direction of the Technical Director and the Project Manager. The individual will have at least 20 years experience developing Meteorological and Hydrological systems and data in Croatia. It is estimated that 35 days will be required at a daily rate of \$640 a day. The rate was calculated with a base salary of \$320 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

Local Engineer - This individual will assist the gathering of detail data and development of the design and implementation plan under the direction of the General Consultant and the Technical Director. The individual will have at least 10 years experience developing Meteorological and Hydrological systems in Croatia. It is estimated that 4 days will be required at a daily rate of \$228 a day. The rate was calculated with a base salary of \$120 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

Translator - This individual will translate documents and provide interpretation as required. The individual be fluent in English and Croatian and have experience as a translator in Croatia. It is estimated that 65 days will be required at a daily rate of \$100 a day. The rate was calculated with a base salary of \$80 a day and includes a fringe benefit rate of 25% and no overhead rate.

Attorney - This individual will assist evaluation of regulatory and environmental requirements. The individual will have relevant experience as an attorney in Croatia. It is estimated that 5 days will be required at a daily rate of \$304 a day. The rate was calculated with a base salary of \$160 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

OTHER DIRECT COSTS

Domestic and Foreign Travel

The Project Manager and the Technical Director will travel to the host country for the Kick-Off Meeting and two subsequent trips for System Design Work. The General Consultant will travel to the host country for the Kick-Off Meeting and two subsequent trips for collection of data for the design and implementation plan.

One Kick-Off Meeting (5 days) to be attended by the Project Manager, Technical Director, Senior Meteorologist, Senior Hydrologist, Computer Specialist and General Consultant

Roundtrip Airfare (Economy Class): \$1,800/per Trip x 5 People = \$9,000

Per Diem: \$223 x 5 days x 5 People = \$5,575



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Local Transportation: $\$50/\text{day} \times 5 \text{ days} \times 5 \text{ people} = \$1,250$
Transportation to/from Airport - U.S.: $\$90/\text{Trip} \times 2 \text{ Trips} \times 5 \text{ persons} = \900
Transportation to/from Airport - Croatia $\$25/\text{Trip} \times 2 \text{ Trips} \times 5 \text{ persons}$

Two Needs Assessment Trips (10 days each) for the Technical Director, Computer Specialist and Senior Meteorologist/Senior Hydrologist

Roundtrip Airfare (Economy Class): $\$1,800 \times 2 \text{ Trips} \times 3 \text{ People} = \$10,800$
Per Diem: $\$223 \times 2 \text{ Trips} \times 10 \text{ days} \times 3 \text{ people} = \$13,380$
Local Transportation: $\$50/\text{day} \times 10 \text{ days} \times 3 \text{ people} \times 2 \text{ trips} = \$3,000$
Transportation to/from Airport - U.S.: $\$90/\text{trip} \times 2 \text{ trips} \times 3 \text{ persons} \times 2 \text{ trips} = \$1,080$
Transportation to/from Airport - Croatia $\$25/\text{Trip} \times 2 \text{ Trips} \times 3 \text{ persons} \times 2 \text{ trips} = \300

One Implementation Plan Trip (5 day) for the Project Manager

Roundtrip Airfare (Economy Class): $\$1,800 \times 1 \text{ Trip} \times 1 \text{ Person} = \$1,800$
Per Diem: $\$223 \times 1 \text{ Trips} \times 5 \text{ days} \times 1 \text{ person} = \$1,115$
Local Transportation: $\$50/\text{day} \times 5 \text{ days} = \250
Transportation to/from Airport - U.S.: $\$90/\text{Trip} \times 2 \text{ Trips} = \180
Transportation to/from Airport - Croatia $\$25/\text{Trip} \times 2 \text{ Trips} = \50

One Final Review Meeting (5 days) to be attended by the Project Manager, Technical Director, and General Consultant

Roundtrip Airfare (Economy Class): $\$1,800/\text{per Trip} \times 2 \text{ People} = \$3,600$
Per Diem: $\$223 \times 5 \text{ days} \times 2 \text{ People} = \$2,230$
Local Transportation: $\$50/\text{day} \times 5 \text{ days} \times 2 \text{ people} = \500
Transportation to/from Airport - U.S.: $\$90/\text{Trip} \times 2 \text{ Trips} \times 2 \text{ persons} = \360
Transportation to/from Airport - Croatia $\$25/\text{Trip} \times 2 \text{ Trips} \times 2 \text{ persons} = \100

Other Expenses

Communications – 52 weeks \times $\$100/\text{week} = \$5,200$ to provide communications among the sponsor, the contractor and all team members.

Reproduction of working documents – 1,000 pages \times $\$0.10/\text{page} = \100

Reproduction of the Final Report – Eight copies of the final report will be reproduced and bound in accordance with the final report specifications provided by USTDA.

Reproduction: 1000 Pages \times $\$0.15/\text{per Copy} \times 8 \text{ Copies} = \150

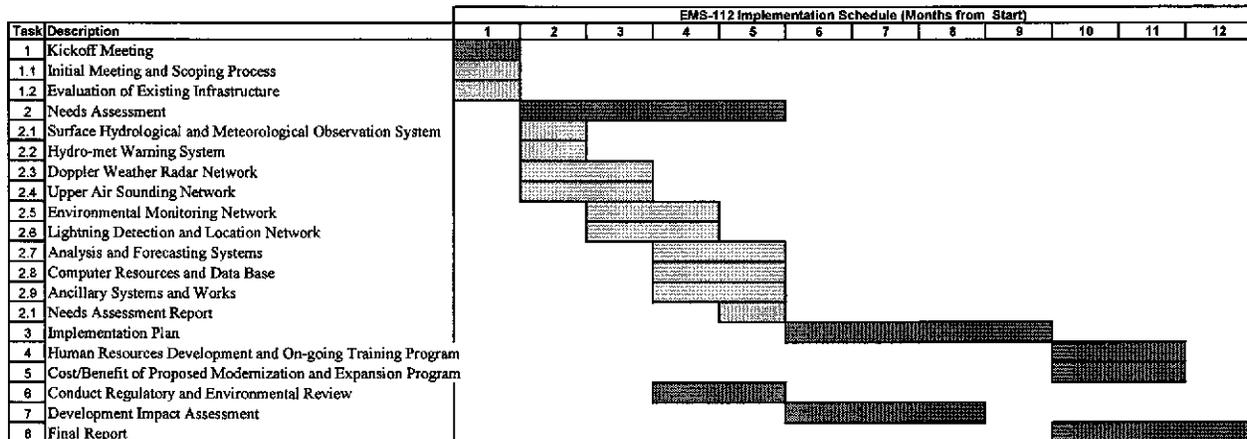
Courier Services – Sending documents to/from Croatia that are not suitable for internet transmittal. 25 shipments \times $\$18/\text{shipment} = \450



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Task Completion Schedule

Figure 8 Completion Schedule



N. Recommendations

USTDA support this Feasibility Study by providing a grant of \$496,000 to MHS to execute the Feasibility Study is recommended.

O. Portfolio Assessment

This is the first project in Croatia of this type and no other projects are underway. Therefore a portfolio assessment is not applicable to this Project.



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

P. Contacts

Ivan Cacic
Director
The Permanent Representative with WMO
Meteorological and Hydrological Service
Republic of Croatia
Gric 3
HR-10000 Zagreb, Croatia
Tel: +385-1-45-65-693
Fax: +1-385-1-48-51-901
Email: cacic@cirus.dhz.hr

Bryce Ford
Lockheed Martin
Business Development Manager
Lockheed Martin MS2
300 M St. SE
Suite 700
Washington, DC 20003
Tel: +1-202-863-3137
Fax: +1-202-863-3102
Email: bryce.ford@lmco.com

Mark Gero
Environmental Committee Chairman
American Chamber of Commerce in Croatia
Krsnjavoga 1
10000 Zagreb, Croatia
Tel: +385-1-4836-777
Fax: +385-1-4836-776
Email: markgero@eco-logicsystems.com

Thomas Kelsey
Commercial Counselor
U.S. Commercial Service
Embassy of the United States of America
Ul. Thomasa Jeffersona 2
10010 Zagreb, Croatia
Tel: +385-1-66-12-224
Fax: +385-1-66-12-446
Email: Thomas.Kelsey@mail.doc.gov

Craig O'Connor
Business Development Officer
International Business Development
Division
United States Export Import Bank
811 Vermont Avenue, N.W.
Washington, DC 20571
Tel: +1-202-565-3556
Fax: +1-(202) 565-3931
Email: craig.oconnor@exim.gov

Nino Radetic
Technical Director
Meteorological and Hydrological Service
Republic of Croatia
Gric 3
HR-10000 Zagreb, Croatia
Tel: +385-1-45-65-784
Fax: +385-1-48-51-901
Email: radetic@cirus.dhz.hr

Niko Raic
Assistant of Minister
State Treasury
Ministry of Finance
Republic of Croatia
Katanciceva 5
10000 Zagreb, Croatia
Tel: +385-1-4591-367
Fax: +385-1-4591-368
Email: niko.raic@mfin.hr

Robert R. Rissland
Executive Vice President
The Republic Group
5801 Lee Highway
Arlington, VA 22207
Tel: +1-703-533-8555 x299
Fax: +1-703-533-3190
Email: rrissland@trgusa.net



Feasibility Study of the Modernization of the Meteorological and Hydrological Service of the Republic of Croatia

Charlotte Ruhe

Director for Croatia
European Bank for Reconstruction and Development
Miramarska 23/III
10000 Zagreb, Croatia
Tel: +385-1-6000-310
Fax: +385-1-6197-218
Email: ruhec@ebrd.com

Fax: +1-202-522-1164
Email: wzakout@worldbank.org
Fax: +359-2-988-0380
Email: d.dimitrov@meteo.bg

Karen J. Shepardson

Senior Operations Officer
Europe and Central Asia Region
Environmentally and Socially Sustainable Development Department
The World Bank
Trg J.F. Kennedy 6B/III
Zagreb 10000, Croatia
Tel: +1-385-1-235-7248
Fax: +1-385-1-235-7200
Email: kshepardson@worldbank.org

Robert Bennett

President
Enviromation Incorporated
11402 Boathouse Pointe
Spotsylvania, VA 22553
Tel: +1-540-972-2446
Fax: +1-540-972-2425
Email:
Bob.Bennett@EnergyandEnvironmentInc.com

Jolanta Kryspin-Watson

Operations Specialist
Environmentally & Socially Sustainable Development Europe and Central Asia Region
World Bank
1818 H Street, NW
Washington, DC 20433
Tel: +1-202-458-0245
Fax: +1-202-614-0698
Email: jkryspin@worldbank.org

Mark Heggli

President
Innovative Hydrology
2280 Grass Valley Hwy #211
Auburn, California 95603
Tel: +1-530-885-8858
Email:
mark.heggli@InnovativeHydrology.com

Wael Zakout

Lead Operations Officer
Environmentally & Socially Sustainable Development Europe and Central Asia Region
World Bank
1818 H Street, NW
Washington, DC 20433
Tel: +1-202-473-3537

ANNEX 3



**U.S. TRADE AND DEVELOPMENT AGENCY
Arlington, VA 22209-2131**

NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS

The purpose of USTDA's nationality, source, and origin requirements is to assure the maximum practicable participation of American contractors, technology, equipment and materials in the prefeasibility, feasibility, and implementation stages of a project.

USTDA STANDARD RULE (GRANT AGREEMENT STANDARD LANGUAGE):

Except as USTDA may otherwise agree, each of the following provisions shall apply to the delivery of goods and services funded by USTDA under this Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from host country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for implementation of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in host country are not subject to the above restrictions. USTDA will make available further details concerning these standards of eligibility upon request.

NATIONALITY:

1) Rule

Except as USTDA may otherwise agree, the Contractor for USTDA funded activities must be either a U.S. firm or a U.S. individual. Prime contractors may utilize U.S.

subcontractors without limitation, but the use of host country subcontractors is limited to 20% of the USTDA grant amount.

2) Application

Accordingly, only a U.S. firm or U.S. individual may submit proposals on USTDA funded activities. Although those proposals may include subcontracting arrangements with host country firms or individuals for up to 20% of the USTDA grant amount, they may not include subcontracts with third country entities. U.S. firms submitting proposals must ensure that the professional services funded by the USTDA grant, to the extent not subcontracted to host country entities, are supplied by employees of the firm or employees of U.S. subcontractor firms who are U.S. individuals.

Interested U.S. firms and consultants who submit proposals must meet USTDA nationality requirements as of the due date for the submission of proposals and, if selected, must continue to meet such requirements throughout the duration of the USTDA-financed activity. These nationality provisions apply to whatever portion of the Terms of Reference is funded with the USTDA grant.

3) Definitions

A "U.S. individual" is (a) a U.S. citizen, or (b) a non-U.S. citizen lawfully admitted for permanent residence in the U.S. (a green card holder).

A "U.S. firm" is a privately owned firm which is incorporated in the U.S., with its principal place of business in the U.S., and which is either (a) more than 50% owned by U.S. individuals, or (b) has been incorporated in the U.S. for more than three (3) years prior to the issuance date of the request for proposals; has performed similar services in the U.S. for that three (3) year period; employs U.S. citizens in more than half of its permanent full-time positions in the U.S.; and has the existing capability in the U.S. to perform the work in question.

A partnership, organized in the U.S. with its principal place of business in the U.S., may also qualify as a "U.S. firm" as would a joint venture organized or incorporated in the United States consisting entirely of U.S. firms and/or U.S. individuals.

A nonprofit organization, such as an educational institution, foundation, or association may also qualify as a "U.S. firm" if it is incorporated in the United States and managed by a governing body, a majority of whose members are U.S. individuals.

SOURCE AND ORIGIN:

1) Rule

In addition to the nationality requirement stated above, any goods (e.g., equipment and materials) and services related to their shipment (e.g., international transportation and insurance) funded under the USTDA Grant Agreement must have their source and origin in the United States, unless USTDA otherwise agrees. However, necessary purchases of goods and project support services which are unavailable from a U.S. source (e.g., local food, housing and transportation) are eligible without specific USTDA approval.

2) Application

Accordingly, the prime contractor must be able to demonstrate that all goods and services purchased in the host country to carry out the Terms of Reference for a USTDA Grant Agreement that were not of U.S. source and origin were unavailable in the United States.

3) Definitions

"Source" means the country from which shipment is made.

"Origin" means the place of production, through manufacturing, assembly or otherwise.

Questions regarding these nationality, source and origin requirements may be addressed to the USTDA Office of General Counsel.

ANNEX 4

USDA & U.S. TRADE & DEVELOPMENT AGENCY

CRO

GRANT AGREEMENT

U.S. TRADE & DEVELOPMENT AGENCY	DATE
<i>[Signature]</i>	JUN -7 2007

5044

This Grant Agreement is entered into between the Government of the United States of America, acting through the U.S. Trade and Development Agency ("USTDA") and the Meteorological and Hydrological Service of the Republic of Croatia ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Agreement US\$495,760 ("USTDA Grant") to fund the cost of goods and services required for a feasibility study ("Study") on the proposed Meteorological and Hydrological Service Modernization Project ("Project") in the Republic of Croatia ("Host Country").

DS AL
[Signature]

1. USTDA Funding

The funding to be provided under this Grant Agreement shall be used to fund the costs of a contract between the Grantee and the U.S. firm selected by the Grantee ("Contractor") under which the Contractor will perform the Study ("Contract"). Payment to the Contractor will be made directly by USTDA on behalf of the Grantee with the USTDA Grant funds provided under this Grant Agreement.

2. Terms of Reference

The Terms of Reference for the Study ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The Study will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the Study shall also be included in the Contract.

3. Standards of Conduct

USTDA and the Grantee recognize the existence of standards of conduct for public officials, and commercial entities, in their respective countries. The parties to this Grant Agreement and the Contractor shall observe these standards, which include not accepting payment of money or anything of value, directly or indirectly, from any person for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study.

4. Grantee Responsibilities

The Grantee shall undertake its best efforts to provide reasonable support for the Contractor, such as local transportation, office space, and secretarial support.

5. USTDA as Financier

(A) USTDA Approval of Competitive Selection Procedures

Selection of the U.S. Contractor shall be carried out by the Grantee according to its established procedures for the competitive selection of contractors with advance notice of the procurement published online through *Federal Business Opportunities* (www.fedbizopps.gov). Upon request, the Grantee will submit these contracting procedures and related documents to USTDA for information and/or approval.

(B) USTDA Approval of Contractor Selection

The Grantee shall notify USTDA at the address of record set forth in Article 17 below upon selection of the Contractor to perform the Study. Upon approval of this selection by USTDA, the Grantee and the Contractor shall then enter into a contract for performance of the Study. The Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the Study that they were not selected.

(C) USTDA Approval of Contract Between Grantee and Contractor

The Grantee and the Contractor shall enter into a contract for performance of the Study. This contract, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing. To expedite this approval, the Grantee (or the Contractor on the Grantee's behalf) shall transmit to USTDA, at the address set forth in Article 17 below, a photocopy of an English language version of the signed contract or a final negotiated draft version of the contract.

(D) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of the contract and any amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of funding the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Grantee or USTDA from asserting any right they might have against the

Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Grantee or USTDA.

(E) Grant Agreement Controlling

Regardless of USTDA approval, the rights and obligations of any party to the contract or subcontract thereunder must be consistent with this Grant Agreement. In the event of any inconsistency between the Grant Agreement and any contract or subcontract funded by the Grant Agreement, the Grant Agreement shall be controlling.

6. Disbursement Procedures

(A) USTDA Approval of Contract Required

USTDA will make disbursements of Grant funds directly to the Contractor only after USTDA approves the Grantee's contract with the Contractor.

(B) Contractor Invoice Requirements

The Grantee should request disbursement of funds by USTDA to the Contractor for performance of the Study by submitting invoices in accordance with the procedures set forth in the USTDA Mandatory Clauses in Annex II.

7. Effective Date

The effective date of this Grant Agreement ("Effective Date") shall be the date of signature by both parties or, if the parties sign on different dates, the date of the last signature.

8. Study Schedule

(A) Study Completion Date

The completion date for the Study, which is September 30, 2008, is the date by which the parties estimate that the Study will have been completed.

(B) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this Grant Agreement for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

9. USTDA Mandatory Clauses

All contracts funded under this Grant Agreement shall include the USTDA mandatory clauses set forth in Annex II to this Grant Agreement. All subcontracts funded or partially funded with USTDA Grant funds shall include the USTDA mandatory clauses, except for clauses B(1), G, H, I, and J.

10. Use of U.S. Carriers

(A) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(B) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

11. Nationality, Source and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

12. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Grantee nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies.

13. Cooperation Between Parties and Follow-Up

The parties will cooperate to assure that the purposes of the Grant Agreement are accomplished. For five (5) years following receipt by USTDA of the Final Report (as defined in Clause I of Annex II), the Grantee agrees to respond to any reasonable inquiries from USTDA about the status of the Project.

14. Implementation Letters

To assist the Grantee in the implementation of the Study, USTDA may, from time to time, issue implementation letters that will provide additional information about matters covered by the Grant Agreement. The parties may also use jointly agreed upon implementation letters to confirm and record their mutual understanding of matters covered by the Grant Agreement.

15. Recordkeeping and Audit

The Grantee agrees to maintain books, records, and other documents relating to the Study and the Grant Agreement adequate to demonstrate implementation of its responsibilities under the Grant Agreement, including the selection of contractors, receipt and approval of contract deliverables, and approval or disapproval of contractor invoices for payment by USTDA. Such books, records, and other documents shall be separately maintained for three (3) years after the date of the final disbursement by USTDA. The Grantee shall afford USTDA or its authorized representatives the opportunity at reasonable times to review books, records, and other documents relating to the Study and the Grant Agreement.

16. Representation of Parties

For all purposes relevant to the Grant Agreement, the Government of the United States of America will be represented by the U. S. Ambassador to Host Country or USTDA and Grantee will be represented by the Director of the Meteorological and Hydrological Service of the Republic of Croatia. The parties hereto may, by written notice, designate additional representatives for all purposes under the Grant Agreement.

17. Addresses of Record for Parties

Any notice, request, document, or other communication submitted by either party to the other under the Grant Agreement shall be in writing or through a wire or electronic medium which produces a tangible record of the transmission, such as a telegram, cable or facsimile, and will be deemed duly given or sent when delivered to such party at the following:

To: Mr. Nino Radetic
Technical Director
Meteorological and Hydrological Service
Republic of Croatia
Gric 3
HR-10000 Zagreb, Croatia

Phone: +385-1-45-65-784
Fax: +385-1-48-51-901
Email: radetic@cirus.dhz.hr

To: U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

All such communications shall be in English, unless the parties otherwise agree in writing. In addition, the Grantee shall provide the Commercial Section of the U.S. Embassy in Host Country with a copy of each communication sent to USTDA.

Any communication relating to this Grant Agreement shall include the following fiscal data:

Appropriation No.: 117/81001
Activity No.: 2007-81017A
Reservation No.: 2007810009
Grant No.: GH2007810002

18. Termination Clause

Either party may terminate the Grant Agreement by giving the other party thirty (30) days advance written notice. The termination of the Grant Agreement will end any obligations of the parties to provide financial or other resources for the Study, except for payments which they are committed to make pursuant to noncancellable commitments entered into with third parties prior to the written notice of termination.

19. Non-waiver of Rights and Remedies

No delay in exercising any right or remedy accruing to either party in connection with the Grant Agreement shall be construed as a waiver of such right or remedy.

20. U.S. Technology and Equipment

By funding this Study, USTDA seeks to promote the project objectives of the Host Country through the use of U.S. technology, goods, and services. In recognition of this purpose, the Grantee agrees that it will allow U.S. suppliers to compete in the procurement of technology, goods and services needed for Project implementation.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Government of the United States of America and the Meteorological and Hydrological Service of the Republic of Croatia, each acting through its duly authorized representative, have caused this Agreement to be signed in the English language in their names and delivered as of the day and year written below. In the event that this Grant Agreement is signed in more than one language, the English language version shall govern.

**For the Government of the
United States of America**

By: Arthur C. Butte

Date: June 1, 2007

Witnessed:

By: Andrea Lupo

**For the Meteorological and Hydrological
Service of the Republic of Croatia**

By: [Signature]

Date: 1st June 2007

Witnessed:

By: [Signature]

Annex I -- Terms of Reference

Annex II -- USTDA Mandatory Clauses

Annex I

Terms of Reference

The Study shall carefully analyze and quantify the impacts of improved forecasts on various sectors in order to optimize the overall Hydrological and Meteorological System Modernization Plan to satisfy the broadest range of needs with greatest positive effect. An end-result of the Study will be the development of an Integrated National Operational Approach for the Meteorological & Hydrological Advanced Monitoring and Forecasting System envisioned herein, and a detailed plan for its implementation. The Study shall be carried out using a structured systems approach which evaluates the development of a complete modernization plan for the Meteorological and Hydrological Service of the Republic of Croatia's (Grantee) hydrology and meteorology forecasting and monitoring systems.

Task 1: Kick-off Meeting

Task 1.1: Initial Meeting and Scoping Process: The Contractor shall meet with the Grantee in Zagreb to launch the Project. During this meeting, the Project's initial work plan shall be reviewed, along with expectations of the Study's goals, objectives, desired outcome, and reporting formats (Contractor to Grantee) of the Project. The Final Report shall be presented to the Grantee and USTDA in the manner described in Task 8 herein and Clause I of Annex II to this Grant Agreement.

During this meeting, the Contractor shall conduct one-on-one meetings with relevant Grantee centers such as, but not limited to:

- Drought;
- Hydrology;
- Agriculture;
- Numerical Modeling;
- Air Pollution;
- Remote Sensing;
- Instrumentation;
- Calibration Center;
- Information Technology; and
- Global Climate Observing System.

The purpose of this task is to clarify the work required to complete these Terms of Reference, and to identify the Grantee staff that should be involved with the Study. During the kick-off meeting, the Contractor and the Grantee shall jointly establish the goals and expectations for completing the Project. The Grantee staff's level of involvement and participation in the planning process shall also be established.

The Contractor shall work with the Grantee on all aspects of the planning for this modernization and expansion process. This includes the technology application and

transfer, project implementation, logistics support, and the development of training and maintenance plans associated with the initial implementation of the Project. The planning process shall be closely developed with the Grantee in order to enhance the likelihood of a satisfactory and acceptable outcome.

Task 1.2: Evaluation of Existing Infrastructure: The Contractor shall gather data and document the existing hydrological and meteorological system in detail. The Contractor shall analyze all elements of the existing infrastructure, including, but not limited to:

- Existing Surface Hydrological and Meteorological Observation Network;
- Hydro-meteorological ("Hydromet") Alert and Warning System;
- Environmental Monitoring System (Climate Change, Air Pollution, Acid Rain);
- Radar Weather Network;
- Upper Air Sounding Network;
- Weather Models (ALADIN), and Forecast Systems;
- Database and Data Processing Capabilities; and
- Human Resources.

Task 2: Needs Assessment

The Contractor shall not only evaluate the needs of the Grantee in each technology category listed below, but also identify how that need is best met along with the associated costs for each solution.

Task 2.1: Surface Hydrological and Meteorological Observation System: the Grantee operates approximately 400 surface hydrological and meteorological platforms. Most of these platforms are operated manually. The Contractor shall develop a design to automate these stations and upgrade the sensor packages. The surface network shall be evaluated by the Contractor as to the suitability of the existing network coverage. The Contractor shall provide recommendations for the addition or subtraction of stations that shall provide efficient coverage of weather event; the Contractor's recommendation shall be made based on the needs of river modeling as well as surface synoptic observations.

The assessment of the surface monitoring and real-time reporting network shall include an assessment of telemetry options that shall allow the real-time reception of surface data to not only the Grantee, but also to members of the World Meteorological Organization (WMO). In particular, the Contractor shall consider open data distribution systems such as the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), which is provided at no charge to the Grantee. Telemetry systems shall be tolerant to natural disasters (i.e., floods, earthquakes, public emergencies) and preferably be on a communication path designed for emergency response (i.e., telemetry such as the Global System for Mobile communication (GSM) networks that are shared with the general public is not

desirable). The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.2: Hydromet Warning System: The Contractor shall design a Hydromet Warning System capable of providing a real-time event warning based on the real-time data network, including the following subsystems:

- Surface Hydrological and Meteorological Observation Network;
- Lightning Detection/Location Network; and
- Doppler Weather Radar Network.

The Hydromet Warning System shall incorporate all aspects of extreme rainfall and high water situations. The Hydromet Warning System shall include a method to automatically receive and incorporate hydro-met data, river and weather forecasts, remote sensing observations into a flood warning application. The Hydromet Warning System shall provide automated dissemination of extreme weather events leading to flooding, or the potential for flooding. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.3: Doppler Weather Radar Network: The existing radar network is comprised of three radars. The Contractor shall develop a Doppler weather radar surveillance design covering the Adriatic Sea west of Croatia to provide lead-time and confirmation of significant weather events from three more radars along the coast of the Adriatic Sea so that oncoming weather events may be monitored. The Study shall also consider the feasibility of upgrading the three existing radars. The Contractor shall work closely with the Grantee in defining the requirements for improved radar surveillance. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.4: Upper Air Sounding Network: The upper air sounding network includes two upper air locations. One upper air station is fully automated, capable of operating continuously for one week; the other upper air station is manual. The Contractor shall prepare a modernization plan for the upper air sounding network including the upgrade of the manual station to a fully automated station with a minimum continual operation of one week (twice a day sounding). The Contractor shall also evaluate the Grantee's requirements for wind profilers and microwave radiometers. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.5: Environmental Monitoring Network (Global Climate Change, Air Pollution, Acid Rain, Surface, and Ozone): The Contractor shall evaluate the current environmental monitoring network. The existing network monitors air pollution and precipitation chemistry (such as acid rain). The Contractor shall design a plan to upgrade the current environmental monitoring network, which shall aim to improve monitoring capabilities and shall meet both European Union (EU) directives as well as WMO standards. The environmental requirements for the system shall be

discussed in detail with the Grantee. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.6: Lightning Detection and Location Network: The Contractor shall develop the design of a lightning detection/location network adequate to support an early warning system of hazardous weather conditions as related to hail, flood, fire, and power generation/distribution for interested industries. Potential customers of this information feed shall be identified in the Study in order to determine the return on investment of this equipment. The Grantee is already in the preliminary phases of developing a Lightning Detection and Location Network, which the Grantee will provide to the Contractor for guidance. The Contractor shall develop the cost of implementation and a standalone implementation plan for this Task for use in Task 3.

Task 2.7: Analysis and Forecasting Systems: The Grantee runs a variety of models, including Aire Limitée Adaptation dynamique Développement International (ALADIN) and MM5 real-time weather forecasting system for both hydrostatic and non-hydrostatic conditions. The Grantee intends to incorporate the Applications of Research to Operations at MEsoscale (AROME) weather forecasting model in the future. The Contractor shall analyze the performance of the models in use by the Grantee, and provide recommendations to the Grantee on which models perform best to help the Grantee in providing improved forecasts for its operational needs. This effort shall require the Contractor to work closely with the Grantee to coordinate and cooperate with ongoing efforts. The Contractor shall evaluate its findings within two sub-sections: 1. Numerical Weather Prediction; and 2. Meteorological Analysis and Display Workstations.

The Grantee desires to automate forecast product generation and distribution, including model output and flood forecasts. The Contractor shall evaluate existing flood forecasting and water supply tools and provide recommendations on the most effective tools available to improve water and weather management forecasts. The Contractor shall consider not only models, but the necessary network of information required to support the model. The Contractor shall also consider an optimum surface monitoring network to feed the models.

In the event a suite of improved models is suggested, the necessary computational resources needed to operate the suite of models shall be recommended. It shall be assumed that any additional computational needs shall be matched with the addition of extra equipment. The Contractor shall assess the total model needs in developing a strategy to supply the computer resources. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.8: Computer Resources and Data Base: The Grantee uses a flat file data base for the storage of most of its meteorological data. The Contractor shall evaluate the data base needs of the Grantee and recommend a new data base and implementation plan. The Grantee would like open source solutions to be sought, which shall reduce the strain of licenses throughout the life of the data base. The

Grantee is aware of the move to PostGreSQL in the United States by the National Weather Service. The Contractor shall evaluate the applicability of PostGreSQL to the proposed Project. The Contractor shall develop the cost of implementation and a standalone implementation plan for this Task for use in Task 3.

The Contractor shall evaluate the existing computer resources and the expected requirements if the modernization and expansion were to be fully engaged. The Contractor shall evaluate the need/requirement for a supercomputer and make a recommendation based on that evaluation.

Task 2.9: Ancillary Systems and Works: Back-up of critical systems and archiving data on media such as automatic tape storage is required to fully implement the Project. The Contractor shall evaluate the storage requirements of the Grantee and the impact of the Project on such storage requirements. The Grantee shall be consulted to insure their needs are reflected in the evaluation of all data storage requirements. The deliverable of this Task shall include a detailed layout of mass storage requirements and how it shall be integrated into existing as well as recommended computer resources. The Contractor shall consider the cost and location of back-up systems to provide suitable protection of the data and a standalone implementation plan for use in Task 3.

Task 2.10: Needs Assessment Report: The Contractor shall prepare a report that identifies the needs of the Grantee by technology, the assessment methodology employed, the recommended method to evaluate those needs, the cost of the resolution, and the priority of each technology resolution. This report shall be reviewed by the Grantee and shall be suitable for use as a guide by other countries in the region in assessing the need for modernizing their system(s).

Task 3: Implementation and Financing Plan: The Contractor shall prepare a complete Implementation Plan for the Project incorporating each of the stated needs above including the recommended resolutions and the standalone implementation plans as defined in Task 2 above.

The Implementation Plan shall consider financing requirements and identify the most likely financing source(s). When identifying financing sources, the Contractor shall at a minimum perform the following:

- Investigate the Croatian Government's willingness to extend a sovereign guarantee to lenders which could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness of the Grantee from the viewpoint of international lenders;
- Obtain indicative term sheets from potential lenders; and
- Develop a financing plan taking into account the comments and requirements of the above-mentioned potential lenders. The financing plan shall include

indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

In addition to the cost of equipment and services, the Implementation Plan shall consider methods of managing financing costs, interest rates, equity requirements, repayment terms, etc. that are required as inputs for the cost/benefit analysis in Task 5. This report shall be reviewed and approved by the Grantee and shall be suitable for use as a guide by other countries in the region in assessing the modernization of their system(s).

Task 4: Human Resources Development and Training Plan: The Contractor shall develop a plan for initial and on-going training for the staff needed to operate the proposed modernization and expansion program consistent with the Implementation Plan. The training plan shall consider the Grantee's needs for a training center. The training program shall consider distance learning, as well as learning modules that can provide a consistent approach to learning. A training plan shall be prepared by the Contractor and reviewed and approved by the Grantee.

Task 5: Cost/Benefit Analysis: In order to justify the modernization and expansion program the Contractor shall prepare a comprehensive cost/benefit analysis consistent with the Implementation Plan. The Contractor's analysis shall compare the cost of the various losses associated with existing capabilities, with reduced losses incurred with the modernization and expansion program. In this Task the Contractor shall in addition to the cost of equipment and services, include financing costs, interest rates, equity requirements, repayment terms, etc. that were developed in Task 3 in the cost/benefit analysis. The Contractor shall prepare a cost/benefit analysis report with implementation recommendations. This report shall be reviewed and approved by the Grantee.

Task 6: Conduct Regulatory and Environmental Review. Based on the proposed conceptual system, the Contractor shall assess current Croatian law and EU regulations. The proposed Project design and implementation shall comply with existing Croatian and EU laws and regulations. The Contractor shall identify laws and regulations that, if modified, would enable more effective local and national implementation.

The Contractor shall complete a preliminary overview environmental assessment of the proposed Project consistent with EU and Croatian standards as well as those of financing institutions such as the World Bank or the European Bank for Reconstruction and Development (EBRD). In addition, the Contractor shall identify significant mitigation measures and associated costs (within +/- 20%) required, if any, to meet the applicable guidelines and regulations and include these costs in the cost/benefit analysis in Task 5 above.

Task 7: Development Impact Assessment: The Contractor shall evaluate the development impacts associated with the Project. These impacts include:

1. An estimate of the Project's potential benefits in the following tasks:
 - Prepare a statement on the infrastructure impact giving a brief synopsis.

- Describe any regulations, laws or institutional changes that are recommended and the effect they would have if implemented.
- Evaluate the number and type of positions that would be needed to construct and operate the proposed Project as well as the number of people who will receive training.
- Describe any advanced technologies that will be implemented as a result of the Project.
- Identify any other development benefits to the Project including any spin-off or demonstration effects.

Task 8: Final Report: The Contractor shall prepare and deliver to the Grantee and USTDA a substantive and comprehensive Final Report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks, and shall include all deliverables and documents that have been provided to the Grantee in connection with the performance of such tasks. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement.

At a minimum the Final Report shall include chapters on:

1. Needs Assessment;
2. Recommended System Design;
3. Implementation and Financing Plan;
4. Human Resources Development and Training Plan;
5. Cost/Benefit Analysis;
6. Regulatory and Environmental Assessment; and
7. Development Impact Assessment

Deliverables: The deliverables of the Study are:

1. Needs Assessment Report (Task 2)
2. Implementation and Financing Plan (Task 3)
3. Human Resources Development and Training Plan (Task 4)
4. Cost/Benefit Analysis Report (Task 5)
5. Final Report (Task 8)

Notes:

- (1) **The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.**
- (2) **The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.**
- (3) **The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work products that are developed under these Terms of Reference.**

Annex II

USTDA Mandatory Contract Clauses

A. USTDA Mandatory Clauses Controlling

The parties to this contract acknowledge that this contract is funded in whole or in part by the U.S. Trade and Development Agency ("USTDA") under the Grant Agreement between the Government of the United States of America acting through USTDA and _____ ("Client"), dated _____ ("Grant Agreement"). The Client has selected _____ ("Contractor") to perform the feasibility study ("Study") for the Meteorological and Hydrological Service Modernization Project ("Project") in the Republic of Croatia ("Host Country"). Notwithstanding any other provisions of this contract, the following USTDA mandatory contract clauses shall govern. All subcontracts entered into by Contractor funded or partially funded with USTDA Grant funds shall include these USTDA mandatory contract clauses, except for clauses B(1), G, H, I, and J. In addition, in the event of any inconsistency between the Grant Agreement and any contract or subcontract thereunder, the Grant Agreement shall be controlling.

B. USTDA as Financier

(1) USTDA Approval of Contract

All contracts funded under the Grant Agreement, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing in order to be effective with respect to the expenditure of USTDA Grant funds. USTDA will not authorize the disbursement of USTDA Grant funds until the contract has been formally approved by USTDA or until the contract conforms to modifications required by USTDA during the contract review process.

(2) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of this contract and amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of financing the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility

or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Client or USTDA from asserting any right they might have against the Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Client or USTDA.

C. Nationality, Source and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

D. Recordkeeping and Audit

The Contractor and subcontractors funded under the Grant Agreement shall maintain, in accordance with generally accepted accounting procedures, books, records, and other documents, sufficient to reflect properly all transactions under or in connection with the contract. These books, records, and other documents shall clearly identify and track the use and expenditure of USTDA funds, separately from other funding sources. Such books, records, and documents shall be maintained during the contract term and for a period of three (3) years after final disbursement by USTDA. The Contractor and subcontractors shall afford USTDA, or its authorized representatives, the opportunity at reasonable times for inspection and audit of such books, records, and other documentation.

E. U.S. Carriers

(1) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(2) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

F. Workman's Compensation Insurance

The Contractor shall provide adequate Workman's Compensation Insurance coverage for work performed under this Contract.

G. Reporting Requirements

The Contractor shall advise USTDA by letter as to the status of the Project on March 1st annually for a period of two (2) years after completion of the Study. In addition, if at any time the Contractor receives follow-on work from the Client, the Contractor shall so notify USTDA and designate the Contractor's contact point including name, telephone, and fax number. Since this information may be made publicly available by USTDA, any information which is confidential shall be designated as such by the Contractor and provided separately to USTDA. USTDA will maintain the confidentiality of such information in accordance with applicable law.

H. Disbursement Procedures

(1) USTDA Approval of Contract

Disbursement of Grant funds will be made only after USTDA approval of this contract. To make this review in a timely fashion, USTDA must receive from either the Client or the Contractor a photocopy of an English language version of a signed contract or a final negotiated draft version to the attention of the General Counsel's office at USTDA's address listed in Clause M below.

(2) Payment Schedule Requirements

A payment schedule for disbursement of Grant funds to the Contractor shall be included in this Contract. Such payment schedule must conform to the following USTDA requirements: (1) up to twenty percent (20%) of the total USTDA Grant amount may be used as an advance payment; (2) all other payments, with the exception of the final payment, shall be based upon contract performance milestones; and (3) the final payment may be no less than fifteen percent (15%) of the total USTDA Grant amount, payable upon receipt by USTDA of an approved Final Report in accordance with the specifications and quantities set forth in Clause I below. Invoicing procedures for all payments are described below.

(3) Contractor Invoice Requirements

USTDA will make all disbursements of USTDA Grant funds directly to the Contractor. The Contractor must provide USTDA with an ACH Vendor Enrollment Form (available from USTDA) with the first invoice. The Client shall request disbursement of funds by USTDA to the Contractor for performance of the contract by submitting the following to USTDA:

(a) Contractor's Invoice

The Contractor's invoice shall include reference to an item listed in the Contract payment schedule, the requested payment amount, and an appropriate certification by the Contractor, as follows:

(i) For an advance payment (if any):

"As a condition for this advance payment, which is an advance against future Study costs, the Contractor certifies that it will perform all work in accordance with the terms of its Contract with the Client. To the extent that the Contractor does not comply with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA. "

(ii) For contract performance milestone payments:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(iii) For final payment:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. Specifically, the Contractor has submitted the Final Report to the Client, as required by the Contract, and received the Client's approval of the Final Report. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(b) Client's Approval of the Contractor's Invoice

(i) The invoice for an advance payment must be approved in writing by the Client.

(ii) For contract performance milestone payments, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and the terms and conditions of the USTDA Grant Agreement."

(iii) For final payment, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and terms and conditions of the USTDA Grant Agreement. The Final Report submitted by the Contractor has been reviewed and approved by the Client. "

(c) USTDA Address for Disbursement Requests

Requests for disbursement shall be submitted by courier or mail to the attention of the Finance Department at USTDA's address listed in Clause M below.

(4) Termination

In the event that the Contract is terminated prior to completion, the Contractor will be eligible, subject to USTDA approval, for reasonable and documented costs which have been incurred in performing the Terms of Reference prior to termination, as well as reasonable wind down expenses. Reimbursement for such costs shall not exceed the total amount of undisbursed Grant funds. Likewise, in the event of such termination, USTDA is entitled to receive from the Contractor all USTDA Grant funds previously disbursed to the Contractor (including but not limited to advance payments) which exceed the reasonable and documented costs incurred in performing the Terms of Reference prior to termination.

I. USTDA Final Report

(1) Definition

"Final Report" shall mean the Final Report described in the attached Annex I Terms of Reference or, if no such "Final Report" is described therein, "Final Report" shall mean a substantive and comprehensive report of work performed in accordance with the attached Annex I Terms of Reference, including any documents delivered to the Client.

(2) Final Report Submission Requirements

The Contractor shall provide the following to USTDA:

(a) One (1) complete version of the Final Report for USTDA's records. This version shall have been approved by the Client in writing and must be in the English language. It is the responsibility of the Contractor to ensure that confidential information, if any, contained in this version be clearly marked. USTDA will maintain the confidentiality of such information in accordance with applicable law.

and

(b) Three (3) copies of the Final Report suitable for public distribution ("Public Version"). The Public Version shall have been approved by the Client in writing and must be in the English language. As this version will be available for public distribution, it must not contain any confidential information. If the report in (a) above contains no confidential information, it may be used as the Public Version (provided USTDA receives a total of four (4) copies). In any event, the Public Version must be informative and contain sufficient Project detail to be useful to prospective equipment and service providers.

The Contractor shall also provide one (1) copy of the Public Version of the Final Report to the Foreign Commercial Service Officer or the Economic Section of the U.S. Embassy in Host Country for informational purposes.

(3) Final Report Presentation

All Final Reports submitted to USTDA must be paginated and include the following:

(a) The front cover of every Final Report shall contain the name of the Client, the name of the Contractor who prepared the report, a report title, USTDA's logo, USTDA's mailing and delivery addresses, and the following disclaimer:

"This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U. S. Government. The opinions, findings, conclusions or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report."

(b) The inside front cover of every Final Report shall contain USTDA's logo, USTDA's mailing and delivery addresses, and USTDA's mission statement. Camera-ready copy of USTDA Final Report specifications will be available from USTDA upon request.

(c) The Contractor and any subcontractor that performs work pursuant to the Grant Agreement must be clearly identified in the Final Report. Business name,

point of contact, address, telephone and fax numbers shall be included for Contractor and each subcontractor.

(d) The Final Report, while aiming at optimum specifications and characteristics for the Project, shall identify the availability of prospective U.S. sources of supply. Business name, point of contact, address, telephone and fax numbers shall be included for each commercial source.

(e) The Final Report shall be accompanied by a letter or other notation by the Client which states that the Client approves the Final Report. A certification by the Client to this effect provided on or with the invoice for final payment will meet this requirement.

J. Modifications

All changes, modifications, assignments or amendments to this contract, including the appendices, shall be made only by written agreement by the parties hereto, subject to written USTDA approval.

K. Study Schedule

(1) Study Completion Date

The completion date for the Study, which is September 30, 2008, is the date by which the parties estimate that the Study will have been completed.

(2) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this contract for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

L. Business Practices

The Contractor agrees not to pay, promise to pay, or authorize the payment of any money or anything of value, directly or indirectly, to any person (whether a governmental official or private individual) for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study. The Client agrees not to receive any such payment. The Contractor and the Client agree that each will require that any agent or representative hired to represent them in connection with the Study will comply with this paragraph and all laws which apply to activities and obligations of each party under this Contract, including but not limited to those laws and obligations dealing with improper payments as described above.

M. USTDA Address and Fiscal Data

Any communication with USTDA regarding this Contract shall be sent to the following address and include the fiscal data listed below:

U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

Fiscal Data:

Appropriation No.:	117/81001
Activity No.:	2007-81017A
Reservation No.:	2007810009
Grant No.:	GH2007810002

N. Definitions

All capitalized terms not otherwise defined herein shall have the meaning set forth in the Grant Agreement.

O. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Client nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies.

ANNEX 5

Annex I

Terms of Reference

The Study shall carefully analyze and quantify the impacts of improved forecasts on various sectors in order to optimize the overall Hydrological and Meteorological System Modernization Plan to satisfy the broadest range of needs with greatest positive effect. An end-result of the Study will be the development of an Integrated National Operational Approach for the Meteorological & Hydrological Advanced Monitoring and Forecasting System envisioned herein, and a detailed plan for its implementation. The Study shall be carried out using a structured systems approach which evaluates the development of a complete modernization plan for the Meteorological and Hydrological Service of the Republic of Croatia's (Grantee) hydrology and meteorology forecasting and monitoring systems.

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- Hydrology;
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- Instrumentation;
- Calibration Center;
- Information Technology; and
- Global Climate Observing System.

The purpose of this task is to clarify the work required to complete these Terms of Reference, and to identify the Grantee staff that should be involved with the Study. During the kick-off meeting, the Contractor and the Grantee shall jointly establish the goals and expectations for completing the Project. The Grantee staff's level of involvement and participation in the planning process shall also be established.

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transfer, project implementation, logistics support, and the development of training and maintenance plans associated with the initial implementation of the Project. The planning process shall be closely developed with the Grantee in order to enhance the likelihood of a satisfactory and acceptable outcome.

Task 1.2: Evaluation of Existing Infrastructure: The Contractor shall gather data and document the existing hydrological and meteorological system in detail. The Contractor shall analyze all elements of the existing infrastructure, including, but not limited to:

- Existing Surface Hydrological and Meteorological Observation Network;
- Hydro-meteorological ("Hydromet") Alert and Warning System;
- Environmental Monitoring System (Climate Change, Air Pollution, Acid Rain);
- Radar Weather Network;
- Upper Air Sounding Network;
- Weather Models (ALADIN), and Forecast Systems;
- Database and Data Processing Capabilities; and
- Human Resources.

Task 2: Needs Assessment

The Contractor shall not only evaluate the needs of the Grantee in each technology category listed below, but also identify how that need is best met along with the associated costs for each solution.

Task 2.1: Surface Hydrological and Meteorological Observation System: the Grantee operates approximately 400 surface hydrological and meteorological platforms. Most of these platforms are operated manually. The Contractor shall develop a design to automate these stations and upgrade the sensor packages. The surface network shall be evaluated by the Contractor as to the suitability of the existing network coverage. The Contractor shall provide recommendations for the addition or subtraction of stations that shall provide efficient coverage of weather event; the Contractor's recommendation shall be made based on the needs of river modeling as well as surface synoptic observations.

The assessment of the surface monitoring and real-time reporting network shall include an assessment of telemetry options that shall allow the real-time reception of surface data to not only the Grantee, but also to members of the World Meteorological Organization (WMO). In particular, the Contractor shall consider open data distribution systems such as the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), which is provided at no charge to the Grantee. Telemetry systems shall be tolerant to natural disasters (i.e., floods, earthquakes, public emergencies) and preferably be on a communication path designed for emergency response (i.e., telemetry such as the Global System for Mobile communication (GSM) networks that are shared with the general public is not

desirable). The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.2: Hydromet Warning System: The Contractor shall design a Hydromet Warning System capable of providing a real-time event warning based on the real-time data network, including the following subsystems:

- Surface Hydrological and Meteorological Observation Network;
- Lightning Detection/Location Network; and
- Doppler Weather Radar Network.

The Hydromet Warning System shall incorporate all aspects of extreme rainfall and high water situations. The Hydromet Warning System shall include a method to automatically receive and incorporate hydro-met data, river and weather forecasts, remote sensing observations into a flood warning application. The Hydromet Warning System shall provide automated dissemination of extreme weather events leading to flooding, or the potential for flooding. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.3: Doppler Weather Radar Network: The existing radar network is comprised of three radars. The Contractor shall develop a Doppler weather radar surveillance design covering the Adriatic Sea west of Croatia to provide lead-time and confirmation of significant weather events from three more radars along the coast of the Adriatic Sea so that oncoming weather events may be monitored. The Study shall also consider the feasibility of upgrading the three existing radars. The Contractor shall work closely with the Grantee in defining the requirements for improved radar surveillance. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.4: Upper Air Sounding Network: The upper air sounding network includes two upper air locations. One upper air station is fully automated, capable of operating continuously for one week; the other upper air station is manual. The Contractor shall prepare a modernization plan for the upper air sounding network including the upgrade of the manual station to a fully automated station with a minimum continual operation of one week (twice a day sounding). The Contractor shall also evaluate the Grantee's requirements for wind profilers and microwave radiometers. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.5: Environmental Monitoring Network (Global Climate Change, Air Pollution, Acid Rain, Surface, and Ozone): The Contractor shall evaluate the current environmental monitoring network. The existing network monitors air pollution and precipitation chemistry (such as acid rain). The Contractor shall design a plan to upgrade the current environmental monitoring network, which shall aim to improve monitoring capabilities and shall meet both European Union (EU) directives as well as WMO standards. The environmental requirements for the system shall be

discussed in detail with the Grantee. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.6: Lightning Detection and Location Network: The Contractor shall develop the design of a lightning detection/location network adequate to support an early warning system of hazardous weather conditions as related to hail, flood, fire, and power generation/distribution for interested industries. Potential customers of this information feed shall be identified in the Study in order to determine the return on investment of this equipment. The Grantee is already in the preliminary phases of developing a Lightning Detection and Location Network, which the Grantee will provide to the Contractor for guidance. The Contractor shall develop the cost of implementation and a standalone implementation plan for this Task for use in Task 3.

Task 2.7: Analysis and Forecasting Systems: The Grantee runs a variety of models, including Aire Limitée Adaptation dynamique Développement International (ALADIN) and MM5 real-time weather forecasting system for both hydrostatic and non-hydrostatic conditions. The Grantee intends to incorporate the Applications of Research to Operations at MEscale (AROME) weather forecasting model in the future. The Contractor shall analyze the performance of the models in use by the Grantee, and provide recommendations to the Grantee on which models perform best to help the Grantee in providing improved forecasts for its operational needs. This effort shall require the Contractor to work closely with the Grantee to coordinate and cooperate with ongoing efforts. The Contractor shall evaluate its findings within two sub-sections: 1. Numerical Weather Prediction; and 2. Meteorological Analysis and Display Workstations.

The Grantee desires to automate forecast product generation and distribution, including model output and flood forecasts. The Contractor shall evaluate existing flood forecasting and water supply tools and provide recommendations on the most effective tools available to improve water and weather management forecasts. The Contractor shall consider not only models, but the necessary network of information required to support the model. The Contractor shall also consider an optimum surface monitoring network to feed the models.

In the event a suite of improved models is suggested, the necessary computational resources needed to operate the suite of models shall be recommended. It shall be assumed that any additional computational needs shall be matched with the addition of extra equipment. The Contractor shall assess the total model needs in developing a strategy to supply the computer resources. The cost of implementation and a standalone implementation plan for this Task are required for use in Task 3.

Task 2.8: Computer Resources and Data Base: The Grantee uses a flat file data base for the storage of most of its meteorological data. The Contractor shall evaluate the data base needs of the Grantee and recommend a new data base and implementation plan. The Grantee would like open source solutions to be sought, which shall reduce the strain of licenses throughout the life of the data base. The

Grantee is aware of the move to PostGreSQL in the United States by the National Weather Service. The Contractor shall evaluate the applicability of PostGreSQL to the proposed Project. The Contractor shall develop the cost of implementation and a standalone implementation plan for this Task for use in Task 3.

The Contractor shall evaluate the existing computer resources and the expected requirements if the modernization and expansion were to be fully engaged. The Contractor shall evaluate the need/requirement for a supercomputer and make a recommendation based on that evaluation.

Task 2.9: Ancillary Systems and Works: Back-up of critical systems and archiving data on media such as automatic tape storage is required to fully implement the Project. The Contractor shall evaluate the storage requirements of the Grantee and the impact of the Project on such storage requirements. The Grantee shall be consulted to insure their needs are reflected in the evaluation of all data storage requirements. The deliverable of this Task shall include a detailed layout of mass storage requirements and how it shall be integrated into existing as well as recommended computer resources. The Contractor shall consider the cost and location of back-up systems to provide suitable protection of the data and a standalone implementation plan for use in Task 3.

Task 2.10: Needs Assessment Report: The Contractor shall prepare a report that identifies the needs of the Grantee by technology, the assessment methodology employed, the recommended method to evaluate those needs, the cost of the resolution, and the priority of each technology resolution. This report shall be reviewed by the Grantee and shall be suitable for use as a guide by other countries in the region in assessing the need for modernizing their system(s).

Task 3: Implementation and Financing Plan: The Contractor shall prepare a complete Implementation Plan for the Project incorporating each of the stated needs above including the recommended resolutions and the standalone implementation plans as defined in Task 2 above.

The Implementation Plan shall consider financing requirements and identify the most likely financing source(s). When identifying financing sources, the Contractor shall at a minimum perform the following:

- Investigate the Croatian Government's willingness to extend a sovereign guarantee to lenders which could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness of the Grantee from the viewpoint of international lenders;
- Obtain indicative term sheets from potential lenders; and
- Develop a financing plan taking into account the comments and requirements of the above-mentioned potential lenders. The financing plan shall include

indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

In addition to the cost of equipment and services, the Implementation Plan shall consider methods of managing financing costs, interest rates, equity requirements, repayment terms, etc. that are required as inputs for the cost/benefit analysis in Task 5. This report shall be reviewed and approved by the Grantee and shall be suitable for use as a guide by other countries in the region in assessing the modernization of their system(s).

Task 4: Human Resources Development and Training Plan: The Contractor shall develop a plan for initial and on-going training for the staff needed to operate the proposed modernization and expansion program consistent with the Implementation Plan. The training plan shall consider the Grantee's needs for a training center. The training program shall consider distance learning, as well as learning modules that can provide a consistent approach to learning. A training plan shall be prepared by the Contractor and reviewed and approved by the Grantee.

Task 5: Cost/Benefit Analysis: In order to justify the modernization and expansion program the Contractor shall prepare a comprehensive cost/benefit analysis consistent with the Implementation Plan. The Contractor's analysis shall compare the cost of the various losses associated with existing capabilities, with reduced losses incurred with the modernization and expansion program. In this Task the Contractor shall in addition to the cost of equipment and services, include financing costs, interest rates, equity requirements, repayment terms, etc. that were developed in Task 3 in the cost/benefit analysis. The Contractor shall prepare a cost/benefit analysis report with implementation recommendations. This report shall be reviewed and approved by the Grantee.

Task 6: Conduct Regulatory and Environmental Review. Based on the proposed conceptual system, the Contractor shall assess current Croatian law and EU regulations. The proposed Project design and implementation shall comply with existing Croatian and EU laws and regulations. The Contractor shall identify laws and regulations that, if modified, would enable more effective local and national implementation.

The Contractor shall complete a preliminary overview environmental assessment of the proposed Project consistent with EU and Croatian standards as well as those of financing institutions such as the World Bank or the European Bank for Reconstruction and Development (EBRD). In addition, the Contractor shall identify significant mitigation measures and associated costs (within +/- 20%) required, if any, to meet the applicable guidelines and regulations and include these costs in the cost/benefit analysis in Task 5 above.

Task 7: Development Impact Assessment: The Contractor shall evaluate the development impacts associated with the Project. These impacts include:

1. An estimate of the Project's potential benefits in the following tasks:
 - Prepare a statement on the infrastructure impact giving a brief synopsis.

- Describe any regulations, laws or institutional changes that are recommended and the effect they would have if implemented.
- Evaluate the number and type of positions that would be needed to construct and operate the proposed Project as well as the number of people who will receive training.
- Describe any advanced technologies that will be implemented as a result of the Project.
- Identify any other development benefits to the Project including any spin-off or demonstration effects.

Task 8: Final Report: The Contractor shall prepare and deliver to the Grantee and USTDA a substantive and comprehensive Final Report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks, and shall include all deliverables and documents that have been provided to the Grantee in connection with the performance of such tasks. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement.

At a minimum the Final Report shall include chapters on:

1. Needs Assessment;
2. Recommended System Design;
3. Implementation and Financing Plan;
4. Human Resources Development and Training Plan;
5. Cost/Benefit Analysis;
6. Regulatory and Environmental Assessment; and
7. Development Impact Assessment

Deliverables: The deliverables of the Study are:

1. Needs Assessment Report (Task 2)
2. Implementation and Financing Plan (Task 3)
3. Human Resources Development and Training Plan (Task 4)
4. Cost/Benefit Analysis Report (Task 5)
5. Final Report (Task 8)

Notes:

- (1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.**
- (2) The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.**
- (3) The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work products that are developed under these Terms of Reference.**