Federal Emergency Management Agency

Work in Progress

January/February 1999

Modernizing FEMA's Flood Hazard Mapping Program

A Message From Mike...

FEMA's Map Modernization Plan continues to move forward, bringing about exciting changes for the NFIP. As always, our emphasis is on customer service—we want to provide the most accurate flood hazard information available in the most accessible format possible, and we want to be available to all stakeholders in the NFIP to answer any and all questions. I'd like to briefly discuss several of our recent initiatives that will help accomplish these goals.

Of course, the primary player in FEMA's role of distributing flood hazard information is FEMA's Map Service Center. Recently, a new Map Service Center contract was awarded to Zimmerman Associates, Inc. (ZAI). After a transition period, ZAI will proceed to turn the Map Service Center into a 21st century data warehouse by utilizing new technologies to improve distribution while at the same time reducing costs. As we move forward into the digital age, we will reduce the paper inventory and storage space while improving customer service and operational efficiencies. Some of the innovations to be implemented include computer-to-plate and print-on-demand technology and the distribution of digital products via the Internet. We look forward to working with the ZAI team to showcase digital mapping technology.

As reported in our September issue, we've made progress in establishing a toll-free customer service hotline to answer questions from across the nation. This toll-free

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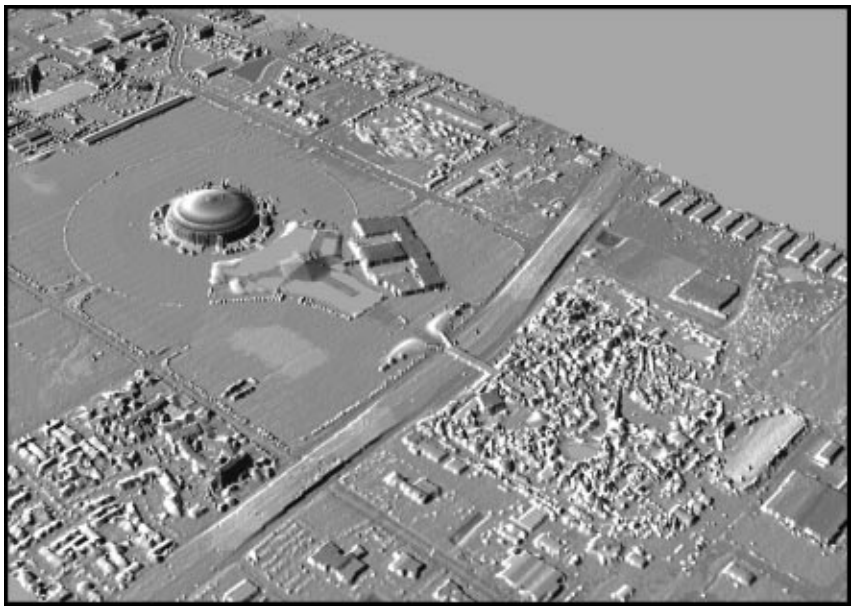

TerraPoint™

LIDAR provides vertical accuracy in the 1-foot range, as shown on this image of the Houston Astrodome.

LIDAR-Based Data Being Used in Harris County, Texas, Flood Study

Harris County, Texas, the second largest seaport in the United States, has experienced land subsidence of up to 4.5 feet during the past 25 years. The County's last major releveling was in 1973, with limited relevelings in 1978, 1987, and 1995, so the full extent of the effects of this subsidence on the county's multiple floodplains is not entirely known.

That may be about to change with the advent of an upcoming flood study, part of a joint effort by FEMA and the Harris County Flood Control District (HCFCD) that will rely on information gathered using sophisticated LIDAR (LIght Detection And Ranging) technology. This is one of several prototype studies that directly support Map Modernization Objective 2.5. It will result in new technical specifications for work map development, a critical component of flood study preparation.

The Harris County data, collected primarily in the fall of 1997, will allow for a more accurate flood study of the county with improved horizontal control, vertical accuracy, and location of structures. This information will be compared to the existing data to determine the effects of the subsidence on the county's floodplains. LIDAR, originally developed for various government

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Work In Progress
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Inside This Issue:

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Cooperative Agreement with Maryland Department of the Environment

In accordance with Map Modernization Objective 7— to bring ongoing cooperative initiatives to a successful completion—FEMA's cooperative agreement with the Maryland Department of the Environment (MDE) is well underway. FEMA's cooperative agreements were designed to involve technically qualified community, county, or state agencies in the flood hazard mapping process. With these agreements, FEMA provides seed money, technical support, maps, and/or data, and the local agency produces digital floodplain data to FEMA's specifications. FEMA reviews and approves the data, which the local agency may maintain and/or update, as needed.

Agreement Scope

The cooperative agreement between FEMA and the MDE involves preparing enhanced and new Q3 Flood Data files. Since 1995, FEMA has produced the Q3 Flood Data product for over 1,300 counties nationwide. Although the product has supported insurance policy marketing initiatives and has been used in hazard analyses, risk assessment, and floodplain management activities, it has several limitations. For example, it lacks a base map and does not contain certain key information, such as base (1-percent-annual-chance) flood elevations (BFEs) and, in some cases, floodways. These limitations mean that it cannot serve as a regulatory document. FEMA's cooperative agreement with MDE will provide the State of Maryland with more useful digital flood data.

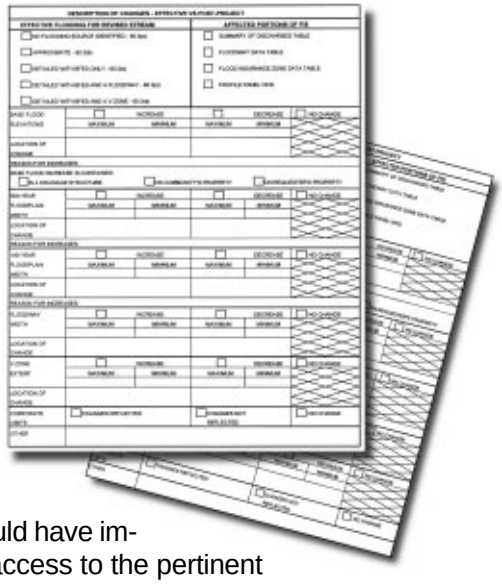
The specific objectives of the cooperative agreement include aligning the existing Q3 Flood Data to Digital Orthophoto Quarter Quadrangles (DOQs) for use by the State of Maryland. Aligning the Q3 boundaries to the DOQ base map will be the first step in converting the Q3 Flood Data to the Digital Flood Insurance Rate Map (DFIRM). The DFIRM may ultimately serve as the regulatory document. Another objective of the cooperative agreement is adding DFIRM features—BFEs, cross sections, and floodways, as necessary—to Q3 Flood Data files. Additionally, a prototype DOQ-FIRM for a pilot county will be prepared.

This project used St. Mary's County as a pilot because Q3 Flood Data and DOQs were available. The MDE reviewed the county's Q3 Flood Data combined with the DOQs and found that, although the overall fit was reasonable, some areas required adjustment. MDE is proceeding with the necessary adjustments.

Lessons learned with the MDE cooperative agreement are helping FEMA to develop digital specifications for the proposed DFIRM 2.0/2.1 products. (See March issue for more details.)

Anne Flowers (anne.flowers@fema.gov)
is the Project Officer for the MDE Cooperative Initiative

Improving the Letter of Map Revision Process



The Objective 35 work group is looking into improving the Letter of Map Revision (LOMR) product and the process by which it is created after the engineering review is completed. We envision that the LOMR will become a document comprised of a cover letter and several technical and administrative enclosures succinctly describing, among other things, the Flood Insurance Study (FIS), and Flood Insurance Rate Map (FIRM) changes and community responsibilities. Presently, LOMRs and conditional LOMRs are lengthy, complex letters requiring recipients to sift through them to obtain the information they need. In addition, preparation of the letters takes a great deal of time, requiring review by two engineers, a technical writer, an engineering director, and a project engineer.

As envisioned by the work group, the new LOMR will consist of a cover letter and several enclosures. The cover letter will describe the basis of the request and the effects of the revision. Placing this information in a separate cover letter will make it immediately accessible to the reader. The following enclosures will be included, as applicable:

- Annotated portions of the FIS report, such as Floodway Data Table, Flood Profiles, and the Summary of Discharges Table.
- Annotated portions of the affected flood hazard map panels.
- Summary of Federal Register and newspaper notices publicizing the flood hazard changes.
- Comparison of the flood hazards as determined by the modeling used for the effective flood hazard map, the modeling of conditions that existed before the revision, and the modeling of post-revision conditions.
- List of data submitted.
- Regulatory authority for making the revision.
- Additional information and reminders.

In addition to providing easy access to specific information, the new LOMR format should decrease the amount of time required to generate the final product by streamlining the letter-preparation process.

The work group is also considering ways to use computer technology to improve the engineering review and letter-preparation process. For instance, database tables could be used throughout the LOMR process to provide an up-to-date case history. Through the database, engineers would have immediate access to the pertinent information about the case. The database could be accessed by personnel staffing FEMA's toll-free telephone line to field questions regarding the status of requests, and aspects of the database could be linked to FEMA's web site. Ultimately, the LOMR writing itself could be automated—the information in the database could be accessed to automatically fill in the information required for the letter and enclosures.

Automation of the LOMR process will allow the engineer to concentrate more fully on reviewing the technical aspects of the revision. It will also allow easy data archival and retrieval for responding to future queries. By simplifying the LOMR format and automating aspects of the review process, FEMA will enhance customer service and satisfaction.

Doug Bellomo (doug.bellomo@fema.gov) *is a Hydraulic Engineer in FEMA's Technical Services Division.*

Work in Progress was produced with the valuable assistance of many individuals in the Mitigation Directorate and across FEMA who contribute to the success of the Map Modernization Plan.

Michael J. Armstrong
Associate Director for Mitigation

Michael K. Buckley
Director, Technical Services Division

Anne Flowers
Editor

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Map Modernization Objectives

FEMA is embarking on a number of Map Modernization objectives for improving the NFIP and its map products. Following is a list of the objectives:

1. ☑ Develop and implement an outreach program to include:
- Exhibit for conferences
- Outreach to key constituencies
- Updated briefing packet
- Congressional outreach
- ***Work in Progress*** Bulletin

(Anne Flowers, anne.flowers@fema.gov)

2. ☑ Develop revised, minimum base map standards for hazard mapping and implement for all new hazard maps as soon as practicable, and not later than FY 1999. (John Gambel, john.gambel @fema.gov)

2.5 ☑ Complete assessment of advanced technologies for preparing topographic mapping and work maps required for the production of Flood Insurance Studies and Flood Insurance Rate Maps. Implement the technologies for study starts in FY 1999 by developing appropriate appendices to "FEMA 37, Guidelines and Specifications for Study Contractors," developing training module, and presenting to FEMA Regional and National office staff. (Karl Mohr, karl.mohr@fema.gov)

3. Develop flexible, prioritized spending plan for map modernization that maximizes alternative sources of funding. (Michael Buckley, mike.buckley@ fema.gov)

4. Develop product specifications for Digital Flood Insurance Rate Map 2.0 and 2.1 (for converting existing manual inventory of Flood Insurance Rate Maps to digital format, and for our new flagship digital multi-hazard map product, respectively) and implement no later than FY 1999. (Mary Jean Pajak, mary.jean.pajak @fema.gov; and Mike Grimm, michael .grimm@fema.gov)

5. Develop Cooperating Technical Communities program to support Project Impact. (Bel Marquez, bel.marquez@fema.gov)

6. ☑ Initiate pilot Cooperating Technical Communities Program. (Project Impact staff, and regional staff)

7. Bring ongoing cooperative initiatives to a successful completion, including: Maryland (Anne Flowers and John Benn, john.benn@fema.gov); New York (Phil Myers, phil.myers@fema.gov; and Paul Weberg, paul.weberg@fema.gov); Georgia (Mary Jean Pajak and Bel Marquez); Midland, Texas (Alan Johnson, alan. johnson@fema.gov; and Region VI staff); and Boone County, Nebraska (Alan Johnson and Region VII staff).

8. ☑ Develop standards and procedures for mapping future condition hydrology. (Mike Grimm)

9. ☑ Develop architecture for the Technical Services Division's Web site. Design to address product distribution, dissemination of information regarding map status, receipt and response to appeals, archives, and other functions. Formulate management structure, cost, and personnel requirements for implementation. (John Magnotti, john.magnotti@ fema.gov)

10. Establish partnership with the National Geodetic Survey (NGS) for assistance in establishing and disseminating geodetic data, such as linking elevation reference mark information on Flood Insurance Rate Maps to the NGS's Web page for geodetic data. (John Gambel)

11. Establish partnership with the U.S. Geological Survey for assistance in developing and maintaining suitable base maps and topographic data compatible with NFIP needs. This includes making Digital Ortho Quads as readily accessible and useable as base maps. (John Gambel)

12. ☑ Establish partnership and provide technical assistance to Fish and Wildlife Service resulting in the Service's improved mapping of Coastal Barrier Resources System (CBRS) areas. Specifically, encourage and assist the Service in producing digital, vector mapping suitable for direct incorporation as a thematic layer in Digital Flood Insurance Rate Maps as well as posting on the World Wide Web. Improve and extend mapping of CBRS-protected areas. (Frank Tsai, frank.tsai @fema.gov)

13. Establish standard operating procedures for making hazard verification part of recovery cycle after Presidentially declared disasters. (Doug Bellomo, doug.bellomo @fema.gov)

14. ☑ Bring the toll-free FEMA Map Assistance Center on line. (John Magnotti)

15. Complete work on the automatic Letter of Map Amendment tracking and letter-generation software, also known as LOMA 2000. (Mark Crowell, mark. crowell@fema.gov)

16. Lay the groundwork for delegation of authority for issuance of Letters of Map Amendment and Letters of Map Revision Based on Fill to community officials and the private sector. Meet with ASCE, ASFPM, ACSM, FMDA, and NAFSMA. (John Gambel)

17. ☑ Develop new study processes, i.e., redefine the Technical Evaluation Contractor/Study Contractor relationship and begin limited implementation in FY 1998, with at least one pilot in each territory. (Marty Frengs, martin.frengs@fema.gov)

18. ☑ Fully implement multi-year contracts and task ordered contracts for procuring Flood Insurance Studies. Transfer the procurement process to the three territories. (Larry Basich, lawrence. basich@fema.gov)

19. ☑ Continue implementation of 5-Year Map Review/Update Process and make it an integral part of the Flood Insurance Study procurement process. Ensure close regional and State involvement. (Cindy Croxdale, cindy.croxdale@ fema.gov)

20. Develop improved systems for monitoring contracted Flood Insurance Studies. Implement Monitoring Insurance Contracted Studies (MICS) software. (Eric Berman, eric.berman@fema.gov)

21. Revise FEMA 37, "Guidelines and Specifications for Study Contractors" and implement for Flood Insurance Studies starting in FY 2000, or partially implement in FY 1999. (Phil Myers, phil.myers @fema.gov)

22. ☑ Revise "Guidelines and Specifications for Technical Evaluation Contractors" and develop statement of work and request for proposal for re-procuring Technical Evaluation Contracts to begin in FY 2000. (Alan Johnson)

23. Oversee all aspects of awarding new Technical Evaluation Contracts to begin in FY 2000. (Cindy Croxdale)

24. Oversee all aspects of award and implementation of new Map Service Center contract to begin in FY 1999. (Kathy Miller, kathy.miller@fema.gov)

25. Respond to National Research Council report on alluvial fans. (Mike Grimm)

26. Initiate regulatory reform at 44CFR, Part 65.5. (Alan Johnson)

27. ☑ Complete riverine erosion study required by National Flood Insurance Reform Act of 1994. (Mike Grimm)

28. Complete coastal erosion studies required by National Flood Insurance Reform Act of 1994. (Mark Crowell)

29. Continue maintenance level research on coastal erosion rate analysis and shoreline location forecasting. (Mark Crowell)

30. Participate as a member of the Community Rating System task force. (Alan Johnson)

31. Finalize "Guidelines and Specifications for Wave Height Studies," Volumes 1 and 2. (Doug Bellomo)

32. ☑ Participate as a National Coordinator in the Federal Civilian Agency Precise Positioning Service (PPS) Committee; enter into a Memorandum of Understanding with the Department of Defense to allow FEMA to use the PPS code in Global Positioning System units to enable more efficient spatial data collection; and organize the internal infrastructure necessary within FEMA to allow the regions to fully utilize this technology in program activities. (Erik Rourke, erik.rourke@fema.gov)

33. Revise and republish "Appeals, Revisions, and Amendments to NFIP Maps: A Guide for Community Officials," FIA 12. Include linkages to Cooperating Technical Communities program. (Eugene Zeizel, eugene.zeizel@fema.gov)

34. Represent FEMA at preparation meetings shaping the worldwide "Year of the Ocean" initiative being endorsed by the United Nations to promote and provide information and education regarding the impact of the ocean, seas, and coastal waters on everyday life. (Doug Bellomo)

35. Improve the Letter of Map Revision process by developing technical and administrative enclosures which succinctly describe map changes and community responsibilities as a result of Letters of Map Revision. (Doug Bellomo)

36. (removed)

37. Identify and compile FEMA's regulations and laws and recommend changes to remove or minimize impediments to FEMA's Map Modernization Plan. (Cecelia Lynch, cecelia.lynch@fema.gov)

SCORECARD

OBJECTIVE		COMPLETED ITEMS
1. Develop and implement marketing plan.	☑	Work In Progress bimonthly Map Modernization Bulletin-inaugural issue published 9/1/98.
	☑	Story boards depicting Chronology of Flood Mapping Products from 1968 to the Future displayed at FEMA HQ.
	☑	Display highlighting major components/ benefits of map modernization developed for travel to conferences and Project Impact events
2. Develop and implement revised, minimum base map standards for hazard mapping.	☑	Final draft for DFIRM 2.0 and 2.1 Base Map Specifications completed 11/98.
2.5 Complete assessment of advanced technologies for preparing topographic mapping and develop appendices to "Guidelines and Specifications for Study Contractors."	☑	"Draft Guidelines and Specifications for Remote Sensing" prepared 1/99.
6. Initiate pilot Cooperating Technical Communities Program.	☑	Ongoing discussions with CTCs.
8. Develop standards and procedures for mapping future conditions' hydrology.	☑	First draft of Future Conditions Hydrology report completed.
9. Develop Technical Services Division's Web site.	☑	Web Architecture completed.
12. Establish partnership with Fish and Wildlife Service to improve mapping of Coastal Barrier Resource System (CBRS) areas.	☑	CBRS Community database on FIA/NFIP Web site.
	☑	Dare County, NC, pilot mapping project completed and a finished map set provided to the NC Congressional delegation.
	☑	Monthly cooperation meetings between FEMA and U.S. Fish and Wildlife Service held.
14. Bring the toll-free FEMA Map Assistance Center on line.	☑	Objective completed.
17. Develop new study processes and begin limited implementation in FY98, with at least one pilot in each territory.	☑	Presented draft recommendations at Engineers' Conference in Emmitsburg, MD—10/98
	☑	Final report with recommendations to FEMA Management—12/31/98
18. Fully implement multi-year contracts and task ordered contracts for procuring Flood Insurance Studies. Transfer procurement process to the three territories.	☑	Objective completed — 11/98.
19. Continue implementation of 5-Year Map Review/Update Process.	☑	Contacted 100 percent of mapped communities participating in the NFIP.
	☑	Sent letters requesting mapping needs to over 19,000 communities.
22. Revise "Guidelines and Specifications for TECs," develop statement of work and request proposal for re-procuring Technical Evaluation Contracts to begin in FY2000.	☑	Revision of "Guidelines and Specifications for Technical Evaluation Contractors" complete.
27. Complete riverine erosion study required by NFIRA.	☑	First draft of Riverine Erosion Hazard Area report completed and mailed to Project Working Group for review and comment.
32. Enter into Memorandum of Understanding with U.S. Department of Defense to allow FEMA to use the PPS code in Global Positioning System.	☑	Signed Memorandum of Agreement—11/98


Work In Progress

November 1998

Modernizing FEMA's Flood Hazard Mapping Program

A Message From Mike...

Five-Year Map Review/Update Ahead of Schedule

Get Work In Progress on the Web

All future issues of the WIP Bulletin will be available on FEMA's home page. Go to **www.fema.gov/tsd/mmod** or just search on "Work in Progress." The advantages of an online Bulletin include:

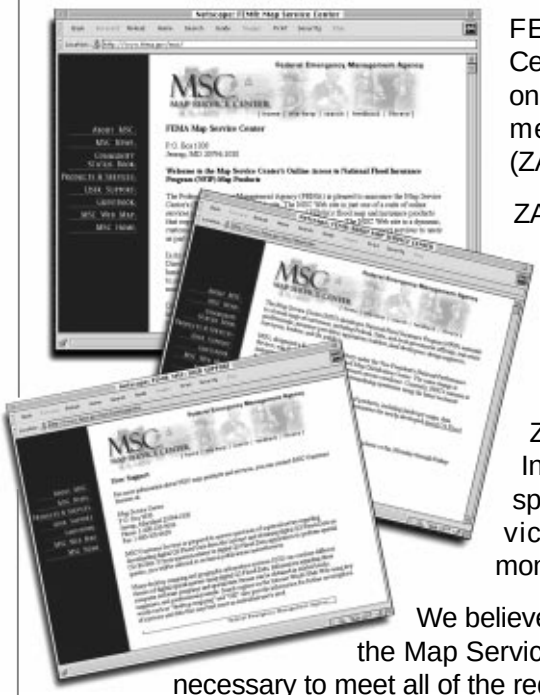
- ☑ Keyword searching for articles and topics of interest
- ☑ Access to back issues
- ☑ Less paper in your office
- ☑ More trees in the forest!

Give the web a try and let us know what you think at **mapmod@fema.gov**. If it works for you or if you find you are not reading your "mailed" WIP Bulletin, please request removal of your name from the mailing list. Help us save trees and program dollars. The funds saved here can be reapplied to support the many Map Modernization activities underway.

I look forward to your feedback.

— Anne Flowers, Editor

A New Contractor for the Map Service Center



FEMA's new Map Service Center contract was awarded on October 30, 1998, to Zimmerman Associates, Inc. (ZAI).

ZAI brings to the Map Service Center twenty years of experience managing information distribution centers and a reputation for outstanding performance.

Zimmerman Associates, Inc., is slated to assume responsibilities at the Map Service Center after a three-month transition period.

We believe the ZAI team will provide the Map Service Center with the support necessary to meet all of the requirements of this contract and advance the Map Service Center into the 21st century.

For more information about the Map Service Center, visit FEMA's website at **www.fema.gov/msc.**

Kathy Miller, (kathy.miller@fema.gov), *is the Project Officer for the Map Service Center.*

Standard Flood Hazard Determination Form and Instructions

FEMA has revised the Standard Flood Hazard Determination Form (FEMA Form 81-93). The effective date of the new form is October 1998 with an expiration date of October 31, 2001.

A copy of the revised form with instructions is available from the following sources:

- ☑ FEMA Web Site
  http:// www.fema.gov/nfip/forms.htm
- ☑ FEMA Fax-On-Demand
  (202) 646-FEMA (document #23103)
- ☑ FEMA Publications Warehouse
  1-800-480-2520

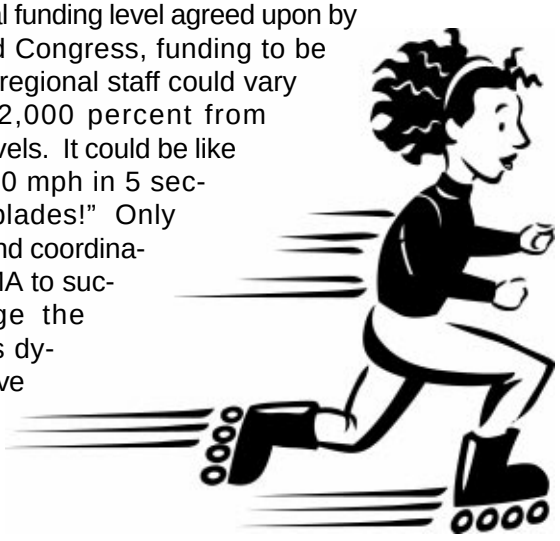
FEMA Engineers' Conference a Success!

The 1998 FEMA Engineers' Conference, held October 26-30,1998, at FEMA's National Emergency Training Center in Emmitsburg, Maryland, had no announced theme, but Map Modernization was the most frequently discussed topic. Regional engineers attended, along with representatives of the technical evaluation contractors, the study contractors, and the quality assurance/quality control contractor.

"It could be like going from 0 to 60 mph in 5 seconds—on Rollerblades!"

Although the FEMA Engineers' Conference is an annual event, this year's conference was especially important because of the changes to the NFIP that the Map Modernization plan is bringing. As Matt Miller, Chief of the Hazards Study Branch, said, "The success of FEMA's flood hazard mapping program depends on a close collaboration among the ten regional offices and the national office. Because many of the Map Modernization objectives are being managed by regional staff scattered across the United States, and all of the objectives must be coordinated among the national and regional offices, this year's conference was a not-to-be-missed opportunity to review where we are and what remains to be done." The exchange of ideas and information that took place at the conference undoubtedly will help ensure the success of Map Modernization.

Of particular interest at the conference was FEMA's projected budget. "One of the biggest challenges our regional staffs face," Mr. Miller pointed out, "is planning for a wide range of possible funding levels for community restudies to be initiated in Fiscal Year 2000. Depending on the final funding level agreed upon by the President and Congress, funding to be committed by the regional staff could vary by as much as 2,000 percent from present funding levels. It could be like going from 0 to 60 mph in 5 seconds—on Rollerblades!" Only careful planning and coordination will allow FEMA to successfully manage the NFIP through this dynamic ride to achieve the goals of Map Modernization.



The following organizations have formally expressed their support of FEMA's Flood Map Modernization Plan:

- ☑ American Congress of Surveying and Mapping
- ☑ American Society of Civil Engineers
- ☑ Association of State Floodplain Managers
- ☑ National Association of Flood and Stormwater Management Agencies
- ☑ National Emergency Management Association
- ☑ National League of Cities
- ☑ National Lenders Insurance Council
- ☑ Technical Mapping Advisory Council

"The benefits of the Modernization Plan reach far beyond simply the internal workings of FEMA, to include the protection of the safety and welfare of citizens throughout the United States.

The members of the American Congress of Surveying and Mapping (ACSM) realize the value of accurate data and the importance of making it easily available, and the Modernization Plan addresses many of our concerns.

The ACSM applauds FEMA's modernization efforts."

— **Mr. James F. Boyer,** President, American Congress of Surveying and Mapping

"***Mike's Message,*** *continued from page 1*

operation will be up and running very soon to answer a broad range of inquiries, including questions about the status of Letters of Map Amendment, how to request revisions to NFIP maps, and the date of the latest NFIP map for a community. By providing better access to answers, we anticipate that all stakeholders in the NFIP will be better served. We'll announce the telephone number in the March issue of ***Work In Progress.***

Finally, to provide access to information about Map Modernization 24 hours a day, FEMA's Technical Services Division is developing a web page on FEMA's web site targeted specifically at the consumer seeking information on flood hazard mapping. Until now, FEMA has provided a substantial amount of information to the consumer on its web site, but this information is not always easy to locate and is often located many levels deep within the site. The *Flood Hazard Mapping* web page will provide answers to virtually all consumer questions without the need to navigate through many pages or levels of the FEMA web site — basically "one stop for all the answers." This page has been targeted at four general consumer groups, homeowners, lenders/insurers, engineers/surveyors and floodplain managers, and has been logically arranged to serve these constituencies. Each group has its own area on the main web page with links to those areas of greatest interest; however, all areas are available to all user groups.

The web page contains such items as answers to frequently asked questions, forms, guidance documents, and FEMA-developed engineering software. Links will be provided to the USACE Hydrologic Engineering Center for obtaining the latest copies of its software packages. A significant feature of the web page is a feature allowing Letter of Map Change requestors to query the status of their requests on-line.

We are excited about the direction the NFIP is taking. We believe that the initiatives discussed above are a major step in providing better service, and we look forward to continuing progress on the Map Modernization Plan.

Michael Buckley (mike.buckley@fema.gov)
is Director of the Technical Services Division of FEMA's National Office

"***LIDAR-Based Data Being Used in Flood Study,*** *continued from page 1*

agencies, can provide vertical accuracy in the 1-foot range and requires little or no ground surveying. FEMA and the HCFCD are negotiating to purchase a usage license from the Houston firm that produced the data.

"LIDAR offers the potential for high volumes of geospatial data at a faster and less expensive rate than competing methods," say Alan Johnson, P.E., Project Engineer in FEMA's Mitigation Directorate, and Jack Quarles, P.E., FEMA Region VI Civil Engineer. The data for this project is provided at approximately one point every 10 feet, which is far more data than obtained by traditional methods.

Because the bulk of the data has already been obtained, the flood study portion of the project is likely to cost less and take less time than traditional flood studies. Unfortunately, for developing coastal analyses, LIDAR technology currently does not provide information on underwater topology.

"It's a wonderful opportunity… We can't afford not to take it."

Other FEMA-funded flood study projects are using LIDAR-based data, but the Harris County study is the only one where the data is also being used to study the effects of land subsidence on the community and its floodplains. Subsidence in Harris County has been caused primarily by the county's dependence on ground water. Harris County and the communities within it are shifting to surface water for their water supply. Other causes of subsidence include oil and gas extraction, soil compaction, organic material decomposition, and tectonic movement.

"Harris County is probably one of the best possible places in the nation to bring together this information regarding subsidence," Mr. Johnson said. Working cooperatively with the HCFCD is also making it possible to bring this large project to fruition.

FEMA Director James Lee Witt invited the county to become a Project Impact community on June 3, 1998. There have been 26 Federal disaster declarations in the county. These have been primarily for flooding, but also include hurricanes, tropical storms, and tornadoes. Both Harris County and Houston, which lies mostly in Harris County, are among the top 10 communities with the highest number of repetitive flood loss structures in the country.

The countywide LIDAR data used in the restudy can be used for Project Impact planning and other mitigation projects as well. The data will be used to update the effective FIS report by providing more detailed and accurate topographic information. It will also provide deeper insight into where and how much subsidence has occurred, and what impact this subsidence has on floodplain limits and depths.

Mr. Johnson said the county's recent entry into Project Impact and the ongoing flood study "help bring together the elements of risk identification and identification of flood mitigation opportunities to address the subsidence issue."

"It's a wonderful opportunity," Mr. Johnson said. "We can't afford not to take it."

Alan Johnson (alan.johnson@fema.gov)
is a Hydraulic Engineer in the Technical Services Division