NATIONAL GEODETIC SURVEY, NOAA
MEMORANDUM

TO: All employees of the National Geodetic Survey
FROM: Dave Zilkoski
DATE: September 26, 2006

ANNUAL GUIDANCE DOCUMENT FOR FY2007

The Annual Guidance Document is an integral part of the new NGS decision making process, as outlined in the NGS Decision Making Model distributed to all NGS personnel on September 1, 2006. The Guidance Document outlines the priorities and activities that the Director believes NGS should focus on for the next fiscal year, 2007, and provides input into the development of the NGS Ten Year Plan. The priorities outlined in this Guidance Document will be incorporated into the FY2007 NGS Execution Plan being developed by the Division Chiefs and NGS Leadership. Much of this development has occurred over the course of the multi-session 2006 Annual Planning Workshop held during the past few weeks. We have learned from our experience of implementing new processes for developing the budget and Execution Plan this year, and we will continue to improve upon the process next year. As part of that improvement, I will release this document earlier in future years.

In a continuation of the "What Lies Ahead" efforts of the past several years, on June 8, 2006, NGS Leadership held the 2006 Annual Leadership Summit. The Summit was attended by the NGS director, deputy director, operations director, chief geodesist, and the division chiefs. *I am pleased to officially announce that at this Summit, leadership agreed to language codifying the NGS Mission.* After thoughtful discussion and amendment, the leadership of NGS unanimously adopted the following mission statement for NGS:

1) To define, maintain and provide access to the **National Spatial Reference System** to meet our nation's economic, social, and environmental needs

and

2) To be a world leader in geospatial activities, including the development and promotion of **standards, specifications, and guidelines**.

A fuller explanation of this mission statement, including definition of terms, is included in Chapter 1, "Mission," of the *NGS Ten Year Plan*. You will find that the definition of the National Spatial Reference System has been broadened to now include the National Shoreline. This new definition will help to better integrate all the efforts within NGS,

including the shoreline mapping efforts. Leadership agreed to and formally adopted Chapter 1 of the *Ten Year Plan*, which is attached to this Guidance Document. Please read and review it, as all activities within NGS, including budgetary requests, should be traceable to this newly adopted Mission.

The day-to-day work of NGS personnel is our mainstay. The commitment and expertise of our personnel is historic. From the initial surveys of the coast almost two centuries ago, to the bilby towers of a few decades ago, to our efforts today to create a modern, dynamic, rapidly accessible reference frame and national shoreline, the National Geodetic Survey has a proud heritage. Thank you all for your efforts and the important work you do every day.

Since 2007 is the 200th Anniversary of the Coast and Geodetic Survey, it is a good time to not only look back on our proud history, but also to look forward to evolving and strengthening NGS for the future. The *NGS Ten Year Plan*, currently being developed, will be an excellent tool to that end. That Plan will build off of the direction, focus, and progress made in the What Lies Ahead process of the past several years and this year, and will chart our course to our future role of building outside capacity to meet the 21st century positioning needs. In the mean time, I offer several points of guidance to help NGS focus its efforts on improvement, and continue transitioning towards our outside capacity building role.

The first step in strengthening NGS for the future will be to improve our approach to developing the division budgets and goals for FY2007. This has begun with the Annual Planning Workshop currently underway. This workshop has taken place in several phases, including two day-long sessions in late August and early September, and a few shorter sessions in September. During this workshop, the Executive Steering Committee (ESC) membership is accomplishing three major things: we have discussed the first draft of the NGS Ten Year Plan, looking at both near-term and far-term changes, goals, and objectives that NGS will need to accomplish; we are discussing the allocation of the budget for FY2007; and we are deciding upon the major milestones and objectives for FY2007.

In the budget proposals submitted to me, I asked the Division Chiefs to provide a more complete explanation for their budget requests than in past years. All divisions were given an initial "skeleton" budget consisting of current expenses for personnel and related costs (salaries, benefits, training, awards, etc.), and were asked to explain how additional budget allocations (for contracts, grants, travel, equipment, etc.) would help meet the mission and goals for NGS. Next year we will improve upon this process, and will work together with staff and division chiefs to ensure we have a proper process for better linking milestones to costs and to the NGS Mission and goals as articulated in the Ten Year Plan (once adopted).

The second step in strengthening NGS for the future is to focus the efforts of our many good programs and projects more specifically. As division chiefs develop their FY 2007 plans, they will be focusing on the areas of emphasis listed below in order of priority:

1. **Retraining and Retooling NGS Workforce to Train Others**: NGS is very good at obtaining very accurate positions, and delineating a national shoreline; we are learning how to be very good at teaching and enabling others to do the same. We need to focus more efforts on training our workforce to be teachers and trainers, rather than just good surveyors, geodesists, and cartographers. This includes improving the quality and expanding the number and diversity of our workshops and forums. This retraining is essential to meeting our future role of building outside capacity to meet the 21st century positioning needs. I will look for specific milestones addressing this retraining.

2. **Improve Communications with NGS Stakeholders:** In addition to improving our budget and execution plan development process, NGS will improve its interactions with stakeholders to better understand and meet their needs. Over the next several months, the Geodetic Services Division, with assistance from all of the divisions, will draft and implement a coordinated plan for stakeholder input and communications. This written plan will lay out how we will gather feedback from our stakeholders (using existing mechanisms, such as the CORS User Forums, as well as new mechanisms), how we will coordinate and analyze that information, how that information will be communicated to leadership and incorporated into the planning process, and who will be responsible for the various components of this plan. The plan will address both external customers as well as programs and offices within NOAA that rely on our services. Understanding our stakeholders' needs is critical to keeping NGS relevant now and into the future. The divisions should each have milestones and plans for how they will contribute to the development and implementation of this stakeholder input and communications plan.

3. **Increase Collaboration and Coordination with our Partners:** As we come to better understand our stakeholders' needs, we will also need to improve our service delivery to meet their needs. This is done best when we engage fully with our wide array of partners. The Spatial Reference Centers house valuable talents, resources, and capabilities from which NGS can benefit. Divisions should coordinate their work plans with those of the Spatial Reference Centers, and decrease the NGS workload by leveraging the resources of the Spatial Reference Centers and the State Coordinators. We must also engage with and develop good relations with other federal and state agencies that share our interests (such as development of the Geoid) so as to leverage their resources as well. As we do this, we will be more likely to accomplish the milestones established in the NGS Execution Plan. I expect the Divisions to have identifiable milestones showing how they will engage with and leverage the resources of our partners.

4. **Improve Models and Tools for Heights:** One of the primary goals of the FY 2007 NGS Execution Plan will be improving models for heights. The geoid model, atmospheric models, and other models that improve the accuracy of GPS-derived orthometric heights should receive particular attention. In addition, NGS

should focus on development of new remote sensing technologies such as LiDAR to improve coastal mapping and FAA products and services. By reallocating existing NGS funds to expand development of Vdatum, the North American Geoid model, troposphere and ionosphere models, and research to develop tools for extracting vertical features from LiDAR data, NGS sends a signal of the importance of these projects to NOAA and others, and thereby enhances our ability to secure additional funding for these projects in the future.

5. **Modernize CORS:** This year, NGS needs to begin transforming the CORS Network to optimize it for the dynamic NSRS we are striving to build. First, NGS needs to define the requirements for and create a set of "foundation CORS" that NGS will treat as critical infrastructure. These foundation CORS need to be co-located with other geodetically significant measurement sites, especially Very Long Baseline Interferometery (VLBI) and Satellite Laser Ranging (SLR) stations. This co-location is essential for defining the long-term stability of the terrestrial reference frame. In addition, NGS should expand efforts to increase the number of CORS co-located with tide gauges, particularly NOAA's National Water Level Observation Network (NWLON) sites. Collectively these efforts will strengthen our ability to accurately correlate water-levels with heights, and strengthen NOAA's ability to monitor sea level changes. Thirdly, NGS must improve its CORS-based products and services to meet evolving technology. NGS should redevelop CORS processing software to be based not just on GPS, but on the entire array of Global Navigation Satellite Systems (GNSS). NGS should be NOAA's expert on Russia's GLONASS, Europe's Galileo, and the other emerging GNSS, as well as GPS. Our products and services should also support the developing field of real-time positioning. Ultimately, we must reduce the field time required to access the NSRS. Finally, NGS must increase the outside capacity of site operators to allow expansion of the CORS network without overwhelming the NGS workforce.

These five areas of emphasis comprise the main focus of NGS for the next year, and impact most if not all of the individual projects, programs, and priorities within NGS. I would like to also highlight four specific project level efforts that I believe deserve attention in the FY 2007 goals. These efforts individually support the five areas of emphasis above.

1. **Integrated Ocean and Coastal Mapping**: NOAA's Integrated Ocean and Coastal Mapping effort derives from the U.S. Ocean Action Plan directive for federal agencies to coordinate federal mapping activities for the U.S. coastal and marine environment. NGS should play an active role in partnering with the Office of Coast Survey to ensure that all mapping activities are coordinated for the best and most efficient use of funds. Since the navigational charting use of NGS data typically exceeds any other user's spatial accuracy requirements, NGS is uniquely suited to meet IOCM challenges. The anticipated acquisition of a

replacement aircraft and sensor suite will greatly increase NGS' ability to be a fully engaged partner in the field. It is NGS' vision to be a leader in IOCM by:

- Identifying a team dedicated to coordinating mapping activities similar to those of NGS across NOAA and other federal agencies
- Establishing standards for collecting and characterizing data to meet multiple program needs
- Making infrastructure investments—vessels, instruments, personnel, data management, contract resources—to get the job done.

2. **Streaming GPS Data via Web Services:** As the world moves rapidly to real-time positioning applications, NGS must keep pace in order to support the industries that are developing these applications. While NGS will not compete directly with the private sector, there are many things we can do to support development of the real-time industry. We can make the data of a limited subset of CORS available in real-time by streaming it over the Internet for use in post-processing applications. This will allow customers to get positions more rapidly, reducing lag time, ensure private real-time networks can successfully interface with the NSRS, and benefit our own shoreline mapping efforts. We can also actively engage in the development of standards and guidelines for real-time networks, and certification of those networks. This will give private industry the foundation they need to provide accurate, compatible real-time services.

3. **Standards and Guidelines:** NGS should increase its focus on creating standards and guidelines. Guidelines that need particular emphasis include, but are not limited to: 1.) better guidelines for surveyors outside of NGS to perform high-accuracy surveys, 2.) real-time kinematic (RTK) survey guidelines, 3.) quality assurance/quality control guidelines for airport surveys, 4.) Integrated Ocean and Coastal Mapping Guidelines for Airborne Remote Sensing, and 5.) finalized GPS-derived orthometric height guidelines.

4. **Data Processing Tools:** In addition to models and tools that increase access to heights, NGS should improve its data processing tools. In particular, we need to improve those tools that allow our users to apply appropriate correctors to data without necessarily submitting the data to the NGS database. We also need to advance those tools that will allow better processing and exploitation of LiDAR data, more efficient production of Airport Obstruction Charts, and effective QA/QC of third party airport surveys.

Finally, I would like to encourage everyone within NGS to improve their efforts to reach out to other parts of NOAA, and to learn what PPBES programs your colleagues outside of NGS fall under. The work I do to build strong relationships with the other leaders and managers in NOAA is much more effective when the employees of NGS are simultaneously developing strong relationships with other NOAA programs. Positioning is the foundation of much if not all of what NOAA does, and everyone needs to help other programs recognize this fact. Collaborations already exist or are possible with many programs, including:

- Surface Weather (SWX), which has interactions with state Departments of Transportation and can benefit from accurate height information;
- Coasts, Estuaries and Oceans (CEO), which benefits from VDatum and accurate positioning for its storm surge models;
- NOAA Homeland Security Program (HSP) and Emergency Response Program (EMR), which are aided by the post-hurricane photos we provide;
- Marine Transportation Systems (MTS), which provides products, information, tools, and services for safe, efficient, and environmentally sound navigation, including sea-level rise analysis, based on our shoreline and positioning products;
- Habitat Program (HAB), which relies on our positioning information and expertise for enhancing coastal restoration projects;
- Weather Water Science, Technology and Infusion Program (WWS), which uses our CORS data to develop perceptible water vapor models.

We have a responsibility to help all of NOAA recognize how our capabilities relate to their programs. As we educate and collaborate with other parts of NOAA, they will recognize that when they have a problem or challenge that is geospatial in nature, we are the experts to whom they can turn for solutions.

My view of NGS is that we are indeed the experts to which NOAA, the nation, and even the world can turn for positioning and geospatial solutions. I encourage us all to work together to make this a continuing reality in 2007.

Sincerely,

Dave Z.

Attached: “Mission” (Chapter 1 of the *NGS Ten Year Plan*)

NGS MISSION

(Chapter 1 of the *NGS Ten Year Plan*)

Revised to reflect changes discussed at the Leadership Summit

MISSION

The National Geodetic Survey (NGS) of the United States is hierarchically located within the Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS). The roots of NGS stretch back 200 years to the Ninth congress of the United States when an Act to perform the survey of the coast of the United States was passed. Over those 200 years, the Survey of the Coast changed its name a few times and broadened its mission to performing the primary geodetic functions of the federal government. Over the last two decades, however, the technologies of geodesy, surveying, remote sensing and mapping have changed radically while NGS has attempted to adapt to the changing environment, continue to serve their customers and fulfill their missions. It is within this changing environment that NGS has embarked upon a new effort of self-reflection, with hopes to plan out ten years of work that will allow NGS to adapt to new and emerging technologies while continuing to perform their critical missions. In order to do this, the missions of NGS must be clearly articulated.

The mission of the National Geodetic Survey of the United States find their basis in a combination of Congressional mandates, Executive orders, DoC/NOAA/NOS mission statements, long-standing tradition and agency introspection. Clearly stated missions not only aid NGS in defining tasks to be performed, they also should aid in prioritizing those tasks. Lastly, clearly defined mission help identify where shortfalls occur in the current work of the agency. As such, budgetary requests should be directly traceable to the completion of these missions.

With due consideration to existing mandates, orders, and tradition[1] the leadership of NGS has come to a concurrence on the mission which will guide NGS from 2006 into the future.

The mission of NGS is hereby understood to be:

3) To define, maintain and provide access to the **National Spatial Reference System** to meet our nation's economic, social, and environmental needs

and

4) To be a world leader in geospatial activities, including the development and promotion of **standards, specifications, and guidelines**.

NGS defines the National Spatial Reference System (NSRS) as the official system of the federal government which allows a user to determine geodetic latitude, longitude and height, plus orthometric height, geopotential, acceleration of gravity, deflection of the vertical at any point within the United States or its territories. Furthermore, the NSRS encompasses the official national shoreline of the United States. The NSRS contains information about its orientation and scale relative to international reference frames, as well as the precise orbits of all satellites used

[1] See Appendix A for a comprehensive analysis of how these missions arise

in defining or accessing the NSRS. Lastly, the NSRS also contains all necessary information to describe how all of these quantities change over time.

Additionally, NGS defines “geospatial activities” as those functions which seek to access the NSRS at one or more points at any accuracy, including (but not limited to) geodesy, surveying, remote sensing and mapping.