

STATEMENT OF WORK NO. 1

Project Title: A New Global Predicted Bathymetry Synthesis for Google Maps & Earth
NO SERVICES MAY BE PERFORMED UNTIL GOOGLE AND CONTRACTOR SIGN THIS STATEMENT OF WORK AND GOOGLE ISSUES A VALID PURCHASE ORDER

This Statement of Work (“**SOW**”) is entered by and between Google Inc. (“**Google**”), with offices at 1600 Amphitheatre Parkway, Mountain View, California 94043, and:

Contractor Name (“ Contractor ”): The Regents of the University of California on behalf of its campus Scripps Institution of Oceanography at the University of California at San Diego, a 501c3, tax-exempt, U.S. not-for-profit corporation.
Address: 9500 Gilman Drive, La Jolla CA 92093-0210
Principal Investigator: Dr. David Sandwell
Telephone: 858-534-7109
Email: dsandwell@ucsd.edu

and is effective as of July 15, 2013 (“SOW Effective Date”).

Manager, Google Ocean Program: <u>Jenifer Austin Foulkes</u>
Telephone: 650-906-2575
Email: jaustin@google.com

Contractor and Google enter into this SOW under the Google Inbound Services Agreement dated July 15, 2013 between the parties (the “**ISA**”).

SERVICES PERIOD. Unless terminated earlier as set forth in the ISA, the Services will end on the completion of the Services by Contractor, which will not be later than December 2015, and acceptance in accordance with the Statement of Work of the Services by Google.

SERVICES. Contractor will provide the following Services to Google:

The goal of this project is to create a new 1-minute prediction of the global bathymetric (underwater terrain) dataset based on an updated global gravity algorithm. There is a keen need to improve global bathymetry and to have a higher resolution shoreline dataset. In the deep ocean, more than 50% of the seafloor is more than 10 kilometers from a real sounding. This data synthesis will become the best global underwater terrain grid available and will be published in the PI’s multi-resolution global bathymetry datasets that feeds into the hill shade in Google Maps and the 3-d map in Google Earth. In addition, new 500 meter resolution multi beam public domain bathymetric data updates from NOAA’s National Geophysical Data Center will be included. Other data cleaning and editing of soundings will also take place. All of these data improvements will feed into creating the next version of the global bathymetric synthesis titled "SRTM15_PLUS" . A version of this data will also be hosted from the Scripps Google Maps Engine account at some point. And work will also be done to provide Google researchers open access to predictions and edited raw sounding data to look at further improvement of the grid.

The PI expects to achieve a factor of 2 improvement in global gravity at latitudes < 72 degrees and a factor of 2-4 times in the Arctic. Prior work has been funded by ConocoPhillips, NSF, ONR and NGA. This translates directly into improved global bathymetry. The current global bathymetric synthesis is based on data from the Naval research lab, Scripps, NOAA, GEBCO, IBCAO, and NOAA’s NGDC and work will be done to determine the relative contribution and rough value of data collected that feeds into this synthesis.

Services Location: Contractor will provide the Services at their own office.

DELIVERABLES. Contractor will deliver the following deliverables and documentation, which will meet the requirements set forth below:

Description of Deliverables:

Timeline:

- A preliminary SRTM30_PLUS will be completed by November of 2013 for review based on the full 409 days of Jason-1 altimetry and current sounding data.
- An updated and edited global multibeam soundings synthesis using new data at NOAA's NGDC will be completed by March 1, 2014.
- Ongoing work will take place with Google researchers to validate and improve the global shoreline dataset.
- A copy of the new SRTM15 PLUS global bathymetry data synthesis will be delivered in September, 2014 and also placed on our public ftp site

Documentation: Semiannual updates on progress will be supplied. Documentation from prior releases is sufficient.

Support and Training: Meetings in person and by phone will take place to facilitate collaboration. David Sandwell will visit Google and present a Tech Talk about the work. Google will publish that Tech Talk on YouTube.

Technical Requirements:

Functional Requirements: All deliverables shall be provided in a machine readable and editable format (e.g., GeoTIFF, Microsoft Word, Excel, ppt, mpp, .txt, .csv), as defined by Google.

Other Requirements:

PERFORMANCE/ACCEPTANCE CRITERIA. The Services will meet the following acceptance criteria, and will pass the following tests:

Acceptance Criteria:

Google researchers will review data and provide feedback to Scripps' colleagues, comparing new data to existing synthesis.

- A preliminary SRTM30_PLUS will be completed by November of 2013 for review based on the full 409 days of Jason-1 altimetry and current sounding data.
- An updated and edited global multibeam soundings synthesis using new data from NOAA's NGDC will be completed by March 1, 2014.
- Ongoing work will take place with Google researchers to validate and improve the global shoreline dataset.
- A new SRTM15 PLUS global bathymetry data synthesis will be delivered in September, 2014.
- The grid is published in the same format as before. Any water marks in the terrain are documented and included in a public README text file with the Latitude and Longitude.

Testing: Quarterly review of project progress will take place as a phone call between Scripps and Google researchers. Google will download and render the grid using a sample script provided by the Contractor.

PAYMENT.

Maximum Payment Amount. Notwithstanding anything else in the Agreement to the contrary and unless otherwise agreed upon in writing by Google, Google's maximum liability for all Services under this SOW will not exceed \$ 120,000.00.

Milestone: Contractor will deliver the deliverables and Google will pay Contractor upon acceptance of Deliverables or timely completion of a milestone, all according to the following schedule:

Milestone or Deliverable	Due Date	Amount Payable Upon Acceptance/Completion
A description of work to be done to achieve the V9 SRTM30_PLUS bathymetry based on improved gravity by November of 2013.	7/20/13	\$60,000.00
Updated and edited multibeam synthesis and SRTM15 PLUS	9/30/14	\$60,000.00

Expenses. Any expenses for travel to train Explore the Ocean layer content contributors, etc., will be borne by Contractor.

Invoices: Contractor's invoices will include the Google PO number and be sent to:

Accounts Payable
Google Inc.
PO Box 2050
Mountain View, CA 94042
USA

CONTRACTOR RESOURCES. Contractor will provide the following to complete the Services:

Contractor's Pre-existing Property: N/A

Contractor's Resources:

Third Party Technology Contractor certifies that it will not include any open source software in the Deliverables.

GOOGLE RESOURCES. All property and assets, whether tangible or intangible, provided by Google to Contractor will remain Google property.

INSURANCE. Pursuant to Section 10 of the ISA, Contractor will maintain the following insurance coverage:

None required

Unless otherwise instructed by Google or its agent, Contractor will send all Certificates of Insurance and other documentation evidencing coverage to:

Google Inc.
Attn: Treasury Department / Risk Management
1600 Amphitheatre Parkway
Mountain View, CA 94043

BACKGROUND CHECKS. Pursuant to Section 10 of the ISA, Contractor will perform the following background checks on its employees, contractors or agents performing Services hereunder:

None required

SPECIAL TERMS. N/A

The parties execute this Statement of Work by persons duly authorized as of the SOW Effective Date set forth above.

Google Inc.	Contractor: _____
By: _____ Title: _____	By: Title: Address: Scripps Inst. of Oceanography, La Jolla, CA, 92093-0225
Address: 1600 Amphitheatre Parkway_ Mountain View, CA 94043_	

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