

PROJECT ADMINISTRATION DATA SHEET

☒ ORIGINAL ☐ REVISION NO. _____Project No. A-3059 DATE 9/18/81Project Director: Ms. M. M. Horst ~~XXXX~~ School/Lab RAIL/MADSponsor: Naval Ship Research & Development Center, Bethesda, MDType Agreement: Contract N00167-81-C-0198Award Period: From 9/10/81 To 5/10/82 (Performance) _____ (Reports) _____Sponsor Amount: \$85,878 Contracted through: _____Cost Sharing: None GTRI/GTF _____Title: RCS Model Comparison with ISAR Data

ADMINISTRATIVE DATA

OCA Contact William F. Brown x4820

1) Sponsor Technical Contact:

Olin Percy, Code 2833Naval Ship Research & Dev. CenterAnnapolis LaboratoryAnnapolis, MD 21402(301) 267-2352

2) Sponsor Admin/Contractual Matters:

G. E. Mayberry, Contract AdministratorNaval Ship Research & DevelopmentCenter, Code 5322: GEMBethesda, MD(202) 227-1100Defense Priority Rating: DO-A3Security Classification: Contract Unclassifiedbut involves SECRET data (See DD254)

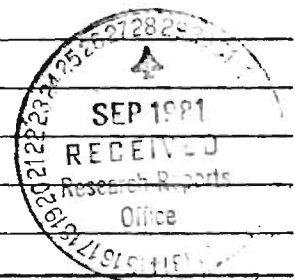
RESTRICTIONS

See Attached Gov't Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of \$500 or 125% of approved proposal budget category.

Equipment: Title vests with None proposed

COMMENTS:



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Computer Input
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Other _____

SPONSORED PROJECT TERMINATION SHEETDate 9/22/82

Project Title: RCS Model Comparison with ISAR Data

Project No: A-3059

Project Director: Ms. M. M. Horst

Sponsor: Naval Ship Research & Development Center, Bethesda, MD

Effective Termination Date: 5/10/82Clearance of Accounting Charges: 5/10/82

Grant/Contract Closeout Actions Remaining:

- ☒ Final Invoice and Closing Documents
- ☐ Final Fiscal Report
- ☒ Final Report of Inventions
- ☒ Govt. Property Inventory & Related Certificate
- ☐ Classified Material Certificate
- ☐ Other _____

Assigned to: RAIL/MAD (School/Laboratory)COPIES TO:

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| | Computer Input |
| | Project File |
| | Other _____ |



ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

A-3059

5 October 1981

Headquarters
David W. Taylor Naval Ship
Research and Development Center
Annapolis, Maryland 21402

Attention: Mr. Olin M. Percy, Code 2833

Subject: Monthly Progress Report No. 1 (Deliverable No. 1) under
Contract N00167-81-C-0198 (GIT/EES Project A-3059)

Gentlemen:

This letter progress report summarizes efforts on the above referenced contract during the month of September 1981.

The project was initiated on 10 September, and preparations for the construction of a geometric computer model of the USS Texas were begun. Photographs of the Texas were received, allowing some initial work on the model, but the bulk of model construction activity still awaits receipt of line drawings of the ship.

A meeting was held at Georgia Tech on 25 September 1981, attended by Olin Percy, DTNSRDC, Harold Toothman, NRL, and Michael Tuley, John Peifer, and Margaret Horst, Georgia Tech. Mr. Percy promised to obtain drawings of the Texas as soon as possible. Methods of conducting the comparisons between measured and predicted ISAR images were discussed, along with some possible problems.

Two changes to the Contract DD Form 254 were discussed with Mr. Percy and received his verbal approval. The first would change Block 11 (n) from "No" to "Yes," thus allowing classified ADP processing under the contract. The second would change the classification guidance for the contract in Block 15 to read: "Classified by OPNAVINST S5513.3A CH-3 (ID: 03A - 17.3) issued 3 April 1981. Review on 3 April 2001." Official approval of these changes will be processed through the Office of Naval Research Resident Representative at Georgia Tech.

Monthly Progress Report No. 1
Contract N00167-81-C-0198
5 October 1981
Page Two

During the next reporting period, efforts will be concentrated on the generation of the geometric model of the Texas, as soon as drawings are received.

Respectfully submitted,

Margaret M. Horst
Project Director

SWC

Approved:

M. T. Tuley, Associate Chief
Modeling and Analysis Division



ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

A-3059

6 November 1981

Headquarters
David W. Taylor Naval Ship
Research and Development Center
Annapolis, MD 21402

Attention: Mr. Olin M. Pearcy, Code 2833

Subject: Monthly Progress Report No. 2 (Deliverable No. 2) under
Contract No. N00167-81-C-0198 (GIT/EES Project A-3059)

Gentlemen:

This letter summarizes efforts on the above referenced contract during the month of October, 1981.

Drawings of the USS Texas were received and primary efforts on the project during the month were devoted to construction of the model for the ship. Initial efforts were concentrated on the detail of the superstructure, which was almost completed by the end of the month. Digitization of the hull was begun near the end of the month, and should be completed soon. Lines and offsets for the shape of the lifeboat hulls are still needed. Mr. Pearcy is trying to obtain these as soon as possible.

During the next reporting period, the model for the Texas will be completed and debugging will be begun from initial RCS predictions.

Respectfully submitted,

Margaret M. Horst
Project Director

Approved:

Harold L. Bassett, Chief
Modeling and Analysis Division



ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

A 3059

1 December 1981

Headquarters
David W. Taylor Naval Ship
Research and Development Center
Annapolis, MD 21402

Attention: Mr. Olin M. Pearcy, Code 2833

Subject: Monthly Progress Report No. 3 (Deliverable No. 3)
under Contract No. N00167-81-C0198 (GIT/EES Project A-3059)

Gentlemen:

This letter summarizes efforts on the above referenced contract during the month of November, 1981.

The computer model data file for the USS Texas was completed as far as all details specified on the drawings received. Additional information indicates that there are several potentially significant scatterers present on the ship that are not indicated on the drawings, so a request was submitted to the Technical Monitor to arrange a visit by Georgia Tech personnel to the ship as soon as possible to obtain the details of such scatterers. If the Texas is not available for a visit, the Virginia would be an acceptable alternative. Hopefully the visit will be possible during the next reporting period.

Efforts are also proceeding on the development of software to conduct the comparison of measured and predicted ISAR images. A computer program has been written to reduce both measured and predicted images to range-only plots and to compare the two on a single plot, with the capability of expanding and compressing the scales of each plot separately to adjust for different calibration factors. Other software is also being pursued, as discussed at the 25 September meeting.

During the next reporting period, the final details of the computer model data file for the Texas will be completed, following a visit by Georgia Tech personnel to the ship at Norfolk. Efforts will continue on the development of software to facilitate the comparison between measured and predicted ISAR images.

Headquarters
1 December 1981
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As of 1 November 1981, total personal services expenditures on the project were \$6.4K, with \$11K total expenditures.

Respectfully submitted,

Margaret M. Horst
Project Director

SWC

Approved:

Michael T. Tuley, Associate Chief
Modeling and Analysis Division

A-3059



ENGINEERING EXPERIMENT STATION

GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

12 January 1982

Headquarters
David W. Taylor Naval Ship
Research and Development Center
Annapolis, MD 21402

Attention: Mr. Olin M. Pearcy, Code 2833

Subject: Monthly Progress Report No. 4 (Deliverable No. 4) under
Contract N00167-81-C-0198 (GIT/EES Project A-3059)

Gentlemen:

This letter progress report summarizes efforts on the above referenced contract during the month of December 1981.

Georgia Tech personnel visited the U.S.S. Virginia at the Norfolk Navy Base on 17 December, and drawings were received at Georgia Tech on 18 December detailing modifications made to the Texas at Norfolk. With the additional information obtained from the photographs and drawings, work began on the final details of the model for the Texas.

Preliminary comparisons have been made between ISAR measurements of the U.S.S. Texas and Georgia Tech predictions. The comparisons have been made for complete images and also for collapsed, range only images. Range only comparisons are made by summing the contributions from all of the doppler cells into a single cross section for each range. The summation is performed incoherently. In range only comparisons there is less ambiguity as to which measured image cells should be compared to which predicted cells. Range only comparisons also simplify the statistical analysis of the predicted fit. The initial results have shown significant differences between the predictions and measurements. Several explanations for the discrepancies have been investigated including improper scaling, incorrect geometry, inaccurate ship model, mismatched target motion, and erroneous sea state. At this time, the ship model is believed to be a main factor in the lack of fit. Many features on the real ship were not yet installed on the ship model which was used to perform the preliminary comparisons. Life boats, antennas, guns, air vents, and other significant features are now being added. The software for performing the data comparisons has been improved and will facilitate the analysis once the ship model is completed.

Headquarters
David W. Taylor Naval Ship
Research and Development Center
12 January 1982
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Additional measured ISAR images have been requested from NRL. As soon as these data are received, the majority of the comparison work will be carried out.

As of 1 December 1981, total personal services expenditures on the project were \$15K with \$30.5K total expenditures.

Respectfully submitted,

Margaret M. Horst
Project Director

swc

Approved:

H. L. Bassett, Chief
Modeling and Analysis Division



ENGINEERING EXPERIMENT STATION
Georgia Institute of Technology
A Unit of the University System of Georgia
Atlanta, Georgia 30332

5 February 1982

Headquarters
David W. Taylor Naval Ship
Research and Development Center
Annapolis, MD 21402

Attention: Mr. Olin M. Pearcy, Code 2833

Subject: Monthly Progress Report No. 5 (Deliverable No. 5)
under Contract No. N00167-81-C-0198
(GIT/EES Project A-3059)

Gentlemen:

This letter summarizes efforts on the above referenced contract during the month of January, 1982.

Final details of the computer model of the Texas were completed, utilizing the information gathered by Georgia Tech personnel who visited the Virginia in Norfolk in December. The drawings received in December detailing modifications to the Texas made at Norfolk since commissioning were examined and also utilized in completing the model representation of the ship. We are still awaiting copies of photographs of the Texas taken by R. Reese of NKF Associates, but do not expect any major modifications to the ship model to result from examination of those photographs.

Telephone conversations with D. Drake of NRL indicate that a magnetic tape containing 83 ISAR images of the Texas will be sent to Georgia Tech soon, but we have not received that data as yet. Preliminary comparisons between measured and predicted ISAR images and collapsed, range-only images have been begun, using the completed ship model. Investigations continue into reasons for discrepancies between predictions and measurements. Improvements have been made to the software for performing the comparisons, and procedures for performing the comparisons are being developed.

Mr. Olin M. Percy, Code 2833
5 February 1982
Page Two

As of 1 January 1982, total personal services expenditures on the project were \$21K, with \$40K total expenditures.

Respectfully submitted,

Margaret M. Horst
Project Director

SWC

Approved:

H. L. Bassett, Chief _____
Modeling and Analysis Division