

## **IOOS HF Radar Data Archiving at NODC**

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Thomas Ryan (NODC),  
Mark Otero (Scripps Coastal Observing Research & Development Center),  
Jack Harlan (IOOS)

### **Background**

More than ten years ago, the need to have a well-structured data archiving process for HF radar data was recognized and documented, *Surface Current Mapping in U.S. Coastal Waters (Paduan et al, 2004. Ocean.US document)*. This need was reiterated and described in more detail in *A Plan to Meet the Nation's Needs for Surface Current Mapping (2009, [http://www.ioos.noaa.gov/library/national\\_surface\\_current\\_plan.pdf](http://www.ioos.noaa.gov/library/national_surface_current_plan.pdf))*. The “Archiving” section of the 2009 document is reproduced here:

“While the NDBC Data Assembly Center (DAC) will have some limited non-real-time storage ability, the archiving of data is the responsibility of NOAA’s National Oceanographic Data Center. The data to be archived include the radial velocity data and the total vector velocity data with their associated metadata. A lower level data type, Doppler spectra, from which radial velocities are derived, will also be archived. However, existing metadata standards do not presently provide the appropriate parameters for HFR Doppler spectra. In coordination with the NOAA IOOS DIF and the IOOS DMAC process, the metadata standards for describing the Doppler spectral data will be identified and developed by NOAA IOOS-sponsored efforts. Similarly, metadata standards for HFR antenna pattern measurements will also be developed so that these measurements can be stored and archived. National products, such as Level 3 and 4 products, e.g., gap-filled velocity fields, would also be submitted for archival as they transition to operations.

Preliminary estimates for the size of the archive per RA range from about 6 terabyte/year, growing to about 25 terabytes/year at buildout, which include the radial velocities, the gridded total velocities, and the Doppler spectra.

The archival decision making process will follow the NOAA Procedure for Scientific Records Appraisal and Archive Approval (2008). This procedure specifies a mechanism to formally document and maintain the steps NOAA takes in identifying, appraising, and approving what scientific records are preserved in a NOAA archive. Some of the input to the process are: data description, including instrument description and processing description; documents, such as user guides; metadata; transfer protocol to the archive center; file size(s); volume per day or month; user access requirements; and search criteria required. In the context of the NOAA archive, “raw” data will refer to the HFR Doppler spectral data. The archival process also allows for multiple versions of the data sets; such as reprocessed data using improved algorithms or recalibrated hardware.”

In FY2013, NOAA IOOS funds were made available to develop a national HF radar data archiving plan to be created as a joint effort by NODC, the IOOS Program Office HF radar (HFR) project manager and Scripps Institution of Oceanography Coastal Observing Research and Development Center (CORDC) staff.

### **Overview**

The intent of this plan is to document many of the details of HFR data archiving from the IOOS National HFR network (HFRNet). Initially, the two data types to be archived are 1) the real-time gridded vector velocities and 2) the radial velocities. The NODC Submission Information Form

(SIF) is a comprehensive and effective method for documenting HFR data archival. A separate SIF for each of the two HFR data type has been completed and comprise the next two sections.

The quote from the 2009 Plan above mentions archiving Doppler spectra data. Recently, at the Radiowave Operators Working Group meeting sponsored by IOOS in March 2014, it was decided by the attendees that the range series data are more useful than Doppler spectra since range series are a more fundamental data type from which Doppler spectra can be reproduced. In the coming year, a SIF will need to be developed for the range series data type.

Presently, there are no Level 3 or 4 datasets being produced by the HFRNet data servers. If those data types become available in the future, SIFs will be developed for those as well.

For this plan, the following two data types residing within HFRNet are described by their SIF.

1. Real-time gridded vector velocities
2. Radial velocities

## Real-Time Gridded Velocity Data

(V1.3, Revised 01/2009)

FORM APPROVAL PENDING

Following the definitions and principles of the *Open Archival Information System (OAIS) Reference Model (ISO 14721:2003)*, this form documents the mutual understanding between a *Producer*, defined as a person or organization who provides information to be preserved, and an *Archive*, defined as the organization that intends to preserve information for access and use over the long term. It should accompany all data submissions to the National Oceanographic Data Center (NODC) and be completed to the extent possible.

The information contained on this form may be used to:

1. Populate NODC's Accession Tracking Data Base and product-specific databases
2. Create metadata records conforming to the Content Standard for Digital Geospatial Metadata (CSDGM), Vers. 2 (FGDC-STD-001-1998) and/or ISO 19115
3. Generate a formal archive appraisal package, for submissions requiring management level approval
4. Develop a list of *Producer* requirements requested of the *Archive*

The information contained on this form is true and correct to the best understanding of the *Producer* and *Archive* at the time of its submission. In the future, this information may be amended, updated, or revised as necessary and some submissions may require management level approvals before archival services can be provided.

### Instructions:

This form is divided into six sections. Section 1 provides only the most basic Tracking Information and is the only section absolutely required at the time of submission. **However, within 1 month all submissions must also include information for Section 2**, which provides basic Data Discovery and Usage Information, and all submissions should strive to provide information through Sections 3 and 4, which provide more comprehensive and detailed information on the data set and its requirements for long term stewardship. Section 5 is required for submissions to the *Archive* that are expected to be periodic or routine in nature, and supports automation of archival services. Section 6 is optional and is only required for submissions that are expected to need management level approval and a formal archive appraisal package. The *Archive* Point of Contact will provide guidance as needed on all of these questions and will work with the *Producer* to ensure both parties reach a mutual understanding.

When complete, please email the signed form (see the last page of the document) to the *Archive* Point of Contact with a copy to [NODC.DataOfficer@noaa.gov](mailto:NODC.DataOfficer@noaa.gov). Closing the email with "Signed," followed by your name is an acceptable form of signature.

## Section 1 – Basic Tracking Information

All elements in this section are REQUIRED, and will enable the *Archive* to establish a unique and durable tracking number known as an NODC Accession Number for the submission. It also clearly establishes whether the *Archive* is able to freely redistribute the data, and if not, what the restrictions are. When appropriate, the *Producer* will be provided the Accession Number in a confirmation receipt, along with the web address where the *Producer* can access the data set. When Section 1 is complete, the submission is considered “Initialized”.

1. Date of submission of this form (or its update):

2 September 2014 or date of update

2. Describe the scope of this data submission information.

This SIF covers the archiving of the HF radar real-time vector files at NODC. These data will be retrieved from NDBC via automated processes and archived monthly.

3. What is the Data Set title? A useful title includes a listing of two or three of the observed variables, the name of one or two of the platforms used to collect data or the project responsible for the data collection activity, the location, and the range of observation dates. For example, “Temperature, salinity, and nutrient data from bottle casts from the *Akademic Korolev*, *Alpha Helix*, *Polar Star*, and *Surveyor* in the Bering and East Siberian Seas from 1987-1999.”

Near-Real Time Surface Ocean Velocities derived from HF radar stations located along coastal waters of the continental U.S., Puerto Rico and the Virgin Islands, Hawaii, Alaska. Atlantic and Gulf coast data will start from October 2008. Pacific coast data will start from September 2009. Hawaii data starts from July 2010, Puerto Rico and USVI starts from January 2010, Alaska-N. Slope data from August 2010 (seasonal), Gulf of Alaska - May 2007 (NODC Accession XXXXXXX)

4. Primary Point of Contact for *Producer* – please provide name, organization, position, address, telephone, fax, and e-mail address.

Mark Otero  
Marine Physical Laboratory  
Programmer/Analyst  
LJ, Isaacs Hall, 335

8855 Biological Grade  
La Jolla, CA 92037  
(858) 822-3537  
motero@ucsd.edu

5. Primary Point of Contact for *Archive* – please provide name, organization, position, address, telephone, fax, and e-mail address.

Tom Ryan  
NESDIS/NODC/DBMD  
Oceanographer  
Building: SSMC3 Routing Code: E/OC1  
Silver Spring, MD 20910-3282  
Phone: 301-713-3272 x 129 Fax: 301-713-3302  
Email: [thomas.ryan@noaa.gov](mailto:thomas.ryan@noaa.gov)

6. Can NODC freely and openly redistribute this dataset? If no, list the *Producer's* constraints of the Data Set in the *Archive* for Users in terms of:
- a. User access to the Data Set
  - b. Uses of the Data Set by Users

NODC may freely distribute the data to the public without restriction.

## Section 2 – Basic Data Discovery and Usage Information

All elements in this section are REQUIRED if applicable and allow the *Archive* to enable users to find, access, and use the data described by this submission. It is strongly recommended that this information be provided at the time of the submission though it is acceptable if some elements are provided within **one month** of Initialization. When Section 2 is complete, the submission is considered “Active”.

1. What is the purpose for collecting this Data Set?

Collect and distribute speed and direction of ocean surface currents in near real time.

2. Provide a general descriptive abstract about the Data Set.

Maps of ocean surface currents have been identified as cross-cutting observational tools that aid a range of scientific and societal applications, including ecological studies, tracking the fate and transport of pollutants, oil spill response, assessment of beach water quality, search and rescue, maritime operations and tracking changes in ocean climate.

High frequency (HF) radar systems measure the speed and direction of ocean surface currents in near real time. Systems operate continuously in all weather conditions and are installed near the coastline. Depending on the desired horizontal resolution of measured currents, the systems are capable of measuring currents anywhere from a 40 to 200 km offshore. Velocities are measured in the upper 0.3 - 2.5 meters of the ocean depending on the operating frequency. Remote sensing of surface ocean velocity from shore-based HF radar sites bridges the operational observational gap between point samples obtained from in-situ sampling and synoptic scale relatively low resolution data obtained from satellites by providing continuous mesoscale coverage at relatively high resolution near the coast.

3. What is the time period covered by the Data Set?

October 2008 (Atlantic and Gulf coasts) through present; September 2009 (Pacific coast) through present. Hawaii data starts from July 2010, Puerto Rico and USVI starts from January 2010, Alaska-N. Slope data from August 2010 (seasonal), Gulf of Alaska - May 2007

4. What is the geospatial coverage of the Data Set (Easternmost longitude, westernmost longitude, northernmost latitude, southernmost latitude)? Note western longitudes and southern latitudes are negative, and use decimal degrees if possible.

west = -174.1174  
east = -61.0056

north = 74.0862  
south = 14.5

5. List the measured variables or parameters in the Data Set (e.g., Temperature, Salinity, etc.)

time, latitude, longitude, u (surface\_eastward\_sea\_water\_velocity), v (surface\_northward\_sea\_water\_velocity), DOPx (longitudinal dilution of precision) & DOPy (latitudinal dilution of precision)

6. List the platform(s) from which the Data Set is derived.

Fixed Coastal Stations -  
<https://docs.google.com/a/noaa.gov/spreadsheet/ccc?key=0AscNsxJAZOw5dHE4WWtodW9WaWxzcmYwVHd2QzFfSEE&usp=sharing>

7. List the instrument(s) used to derive the Data Set.

HF radar

8. List the observation types in the Data Set (e.g., Biological Data, Physical Data, etc.).

Physical

9. List the mission/project name(s) to which the Data Set contributes.

U.S. National HF Radar Network

10. Give the expected size(s) in bytes and number of files in the submission.

720 MB and 8640 files per month, 8.6 GB and 105,120 files per year

11. Give the file format and format version (e.g., netCDF-3, HDF-5, ASCII CSV, etc.).

netCDF-4

12. Does this Data Set conform to any file-level data content or metadata content standards? (e.g., COARDS/CF, HDF-EOS, WOCE, GHRSSST)

## CF 1.1

13. Please describe the file contents. Include enough information to make these data understandable to future users. For example, a table containing as applicable: parameter definition, data type, byte size/length, scale factor, offset, precision, and units. This information is especially important for ASCII and other formats which are not self-describing like netCDF and HDF. If this information is already contained in a file or file headers included in this submission, please indicate the file name.

```
int time(time) ;
    time:standard_name = "time" ;
    time:units = "seconds since 1970-01-01" ;
    time:calendar = "gregorian" ;
    time:_CoordinateAxisType = "Time" ;
float lat(lat) ;
    lat:standard_name = "latitude" ;
    lat:units = "degrees_north" ;
    lat:_CoordinateAxisType = "Lat" ;
float lon(lon) ;
    lon:standard_name = "longitude" ;
    lon:units = "degrees_east" ;
    lon:_CoordinateAxisType = "Lon" ;
short u(time, lat, lon) ;
    u:standard_name = "surface_eastward_sea_water_velocity" ;
    u:units = "m s-1" ;
    u:_FillValue = -32768s ;
    u:scale_factor = 0.01f ;
    u:ancillary_variables = "DOPx" ;
short v(time, lat, lon) ;
    v:standard_name = "surface_northward_sea_water_velocity" ;
    v:units = "m s-1" ;
    v:_FillValue = -32768s ;
    v:scale_factor = 0.01f ;
    v:ancillary_variables = "DOPy" ;
short DOPx(time, lat, lon) ;
    DOPx:long_name = "longitudinal dilution of precision" ;
    DOPx:comment = "The longitudinal dilution of precision (DOPx) represents the\n",
        "contribution of the radars\' configuration geometry to\n",
        "uncertainty in the eastward velocity estimate (u). DOPx is a\n",
        "direct multiplier of the standard error in obtaining the\n",
        "standard deviation for the eastward velocity estimate from the\n",
        "least squares best fit. DOPx and DOPy are commonly used to\n",
        "obtain the geometric dilution of precision\n",
        "(GDOP = sqrt(DOPx^2 + DOPy^2)), a useful metric for filtering\n",
        "errant velocities due to poor geometry." ;
```

```

DOPx:_FillValue = -32768s ;
DOPx:scale_factor = 0.01f ;
short DOPy(time, lat, lon) ;
DOPy:long_name = "latitudinal dilution of precision" ;
DOPy:comment = "The latitudinal dilution of precision (DOPy) represents the\n",
               "contribution of the radars\' configuration geometry to\n",
               "uncertainty in the northward velocity estimate (v). DOPy is a\n",
               "direct multiplier of the standard error in obtaining the\n",
               "standard deviation for the northward velocity estimate from the\n",
               "least squares best fit. DOPx and DOPy are commonly used to\n",
               "obtain the geometric dilution of precision\n",
               "(GDOP = sqrt(DOPx^2 + DOPy^2)), a useful metric for filtering\n",
               "errant velocities due to poor geometry." ;
DOPy:_FillValue = -32768s ;
DOPy:scale_factor = 0.01f ;

```

14. Give the file-naming convention for the file(s) to be submitted, with the range/domain of each field value in the filename.

File name: YYYYMMDDMM\_instrument\_region\_resolution\_product\_processing\_institution  
 where YYYYMMDDMM = Year, month, data, minutes; instrument = collection instrument;  
 region = region data collected; resolution = resolution of the data collected; product = type of  
 product; processing = processing done for product; and institution = institution where data was  
 processed

Domains of filename -

instrument: high frequency radar (hfr)

region: Eastern US and Gulf of Mexico (usegc), Puerto Rico/Virgin Islands (prvi), West Coast  
 (uswc), Hawaii (ushi), Gulf of Alaska (gak), North Slope Alaska (AKNS)

resolution: 500m, 1km, 2km, 6km (m = meter, km =kilometer)

product: rtv (real-time vector)

processing = uwls (unweighted least squares)

institution = NDBC, SIO, Rutgers

15. Please provide a list of existing reports, publications, user guides, web sites, or other supporting documentation relevant to the Data Set.

**The Integrated Ocean Observing System High-Frequency Radar Network: Status and Local, Regional, and National Applications**

**Marine Technology Society Journal, MTS, November/December 2010 Volume 44**

**Number 6**

[Download Article](#) (pdf)

[National HF Radar Technical Steering Team Position Paper on Use of HF Radar in Freshwater](#) (pdf)

[National HF Radar Technical Steering Team Position Paper on Use of HF Radar for Wave Measurement](#) (pdf), Aug 2012

[High Frequency Radar 101 Presentation](#) (pdf)

[High-Frequency Radar for Ocean Surface Current Mapping: Best Practices](#) (pdf)

[Mapping Surface Currents around U.S. Coasts](#) (pdf)

[Bibliography of HF Radar Comparisons with Other Sensors](#) (pdf)

[IOOS and U.S. Coast Guard Search and Rescue Responsibilities](#) (pdf)

[Search and Rescue Operations \(SAROPS\) Environmental Data Sources: Their Uncertainties](#) (pdf)

[IOOS HF Radar Data and Its Use by the U.S. Coast Guard for Search and Rescue](#) (pdf)

[CODAR SeaSonde QA/QC Remote Monitoring Checklist](#) (pdf)

[CODAR SeaSonde QA/QC Setup and Diagnostics](#) (pdf)

16. What metadata exists for this Data Set? Is it in a standard format/can it be automatically translated into a standard format? Describe the granularity of this metadata (For example, is it collection level metadata? If not, to what file or grouping of files does it apply?)

[Metadata is contained in netCDF file](#)

17. If applicable, describe the temporal resolution of the primary parameter(s) in the Data Set.

[One file per region per resolution hourly](#)

18. If applicable, describe the horizontal resolution of the primary parameter(s) in the Data Set.

500m, 1km, 2km, and 6km resolutions

19. If applicable, describe the vertical resolution of the primary parameter(s) in the Data Set.

NA

20. If applicable, describe the projection grid or coordinate system used in the Data Set.

Coordinate system is WGS84 and the gridded data are based on an equidistant cylindrical projection

21. If the Technical Contact for the *Producer* is different from the Primary Contact for the *Producer* (1.4), please provide name, organization, position, address, phone, fax, and email.

Rex Hervey  
Organization: NWS/OOS/NDBC/EB  
Position Title: Meteorologist  
1007 Balch Blvd (NDBC) Room: 327  
Building: 3203 Routing Code: W/OPS51  
Stennis Space Center, MS 39529-6000  
Phone: 228-688-3007  
Fax: 228-688-3153  
Email: rex.hervey@noaa.gov

22. If the Metadata Contact for the *Producer* is different from the Primary Contact for the *Producer* (1.4), please provide name, organization, position, address, phone, fax, and email.

Same as primary contact

23. If the Technical Contact for the *Archive* is different from the Primary Contact for the *Archive* (1.5), please provide name, organization, position, address, phone, fax, and email.

**John Relph**  
**Organization: NODC**  
**Position:**  
**Address: SSMC 3, 4<sup>th</sup> floor, OC3**  
**1315 East-West Highway**  
**Silver Spring, MD 20910**  
**Phone: 301-713-3284**  
**Email: John.Relph@noaa.gov**

24. If the Metadata Contact for the *Archive* is different from the Primary Contact for the *Archive* (1.5), please provide name, organization, position, address, phone, fax, and email.

Same as primary contact

### Section 3 – Detailed Data Processing and Quality Information

All elements in this section are STRONGLY RECOMMENDED and allow the *Archive* to enable more complete and thorough understanding of the data over the long term.

1. What is the overall completeness and quality of the Data Set?

Complete and of high quality

2. Describe the data processing level of the Data Set. For example, is the Data Set unprocessed or minimally processed, quality controlled or calibrated, etc.? For satellite data, is it Level 0, 1, 2, 3, or 4?

Real time vectors in this dataset are computed from a lower level product known as radial velocities. Radial velocities are computed from direct measurements of radar backscatter or sea echo by individual HF radar sites. Automated quality control measures are used throughout processing.

3. Summarize the science algorithms(s) used to derive the Data Set.

The eastward (u) and northward (v) components of real time (total) vector solutions are computed by unweighted least squares from radial velocities. Processing parameters defining how radial velocities are selected in computing total solutions are provided in NetCDF metadata.

4. Describe the steps taken to process the Data Set, including for each step the methodology, source data, and time/frequency, and listing any input data sets used to derive the Data Set.

30-minute to hourly radial velocities collected continuously from HF radar sites through the U.S. HF Radar Network are processed to produce real time velocities. Real time velocities are computed every 30 minutes for each continuous section of coastline or domain and each resolution to produce hourly maps of surface ocean velocities. Maps for any given hour are reprocessed whenever new data arrives within the near real-time reprocessing threshold (currently 26 hours from real-time).

5. Describe the Data Set's dependency on other data (e.g. ancillary files), processing systems, software, or entities that are not to be submitted to the Archive.

This dataset is derived from radial velocities that will be submitted to the Archive. U.S. HF Radar Network software is used to create this dataset from radial velocities. The U.S. HF Radar Network software and maintained by Scripps Institution of Oceanography's Coastal Observing Research and Development Center through grants provided by NOAA Integrated Ocean Observing System.

6. Detail any measures taken by the Producer to assess the quality of the Data Set, including data comparisons, and an assessment of the attribute accuracy. Give information about omissions, selection criteria, and other rules used to derive the Data Set.

Quality control is documented in [HF Radar Network Near-Real Time Ocean Surface Current Mapping](#). Comparisons and validation of HF Radar based measurements of ocean surface velocity are compiled in a [bibliography of HF Radar Comparisons with Other Sensors \(pdf\)](#)

7. List any quality assessment parameters included in the Data Set. For example, this may be an explanation of quality flags and their range/domain of values.

The latitudinal and longitudinal dilution of precision (DOP<sub>y</sub> and DOP<sub>x</sub>) represent the contribution of the available radar array configuration geometry to uncertainty in the northward (v) and eastward (u) velocity estimates, respectively. DOP<sub>y</sub> and DOP<sub>x</sub> are direct multipliers of the standard error in obtaining the standard deviation for the northward and eastward velocity estimate from the unweighted least squares solution. DOP<sub>x</sub> and DOP<sub>y</sub> are commonly used to obtain the geometric dilution of precision ( $GDOP = \sqrt{DOP_x^2 + DOP_y^2}$ ), a useful metric for filtering errant velocities due to poor geometry. Real time velocity data is filtered by a GDOP to provide the best usable data. The specific GDOP threshold is documented in the NetCDF metadata.

## Section 4 – Data Stewardship Information

All elements in this section are STRONGLY RECOMMENDED and enable the *Archive* to provide more comprehensive *data stewardship* over the long term. Data stewardship requires a more extensive set of functions than traditional long-term preservation of data and information, and includes activities such as monitoring the needs of user communities, compliance testing, quality assurance, and use of this Data Set in larger integrated product databases. Importantly, this section provides the *Producer* with an opportunity to request specific services from the *Archive*. This document does not imply that all of these services will be provided, but typically the *Archive* will work to meet them on a best-effort basis.

1. Please describe any quality control or quality assurance procedures the *Archive* should perform on this Data Set when it is submitted to the *Archive*. How will the *Producer* provide updates to the *Archive* when changes occur in the Data Set, transmission mechanism, format, content, etc.? How often might such changes be expected to occur?

Check for completeness of transmission and notify provider if problems occur.

2. Does the *Producer* request reports on the *Archive*'s dissemination of the Data Set? If so, what statistics should be included? (Please note federal regulations strictly limit the amount and kind of information that can be recorded by federal agencies.)

Yes, please include all available statistics

3. Does the *Producer* request standards compliance testing on the Data Set? For example, should the *Archive* verify data files are meeting netCDF Climate and Forecast (CF) conventions, or should metadata records be checked for adherence to the FGDC content standard? Will the *Producer* perform standards compliance testing prior to submission to the *Archive*?

No, compliance checks are performed after each change to production files.

4. Suggest action(s) for the *Archive* in the case of an error in transmission (e.g. missing data, duplicate data, incorrect file name or size, failure of compliance checks).

Check for completeness of transmission and notify provider if problems occur.  
a. Check for package completeness (manifest check with versions)

5. Please list any known NODC product databases (e.g. World Ocean Data Base) that this Data Set should become a part of.

All applicable

6. Please identify one or more Representative Users of the *Designated Community*. The Designated Community is defined in the OAIS Reference Model as the group of potential users who should be able to understand a Data Set over the long term. The *Archive* works specifically to preserve the data and information for this Designated Community.
- Describe this user community and their requirements
  - Provide Contact Information for a representative of this community - please provide name, organization, position, address, telephone, fax, and e-mail address

None

7. List security requirements for dissemination of the Data Set from the *Archive* to the users.

None required

8. Once the Data Set is transferred to the *Archive*, how long should it take for it to become searchable? How long should it take to become accessible online?

Within 24 hours

9. Describe any preferred search criteria to be enabled for this Data Set in the *Archive* (e.g., search by time, search by geographic bounding box on a Polar Stereographic map, etc.)

No preference

10. Describe any the preferred access mechanisms to be enabled for this Data Set in the *Archive* (e.g., OPeNDAP, Web Coverage Services, FTP, etc.)

No preference

## Section 5 – Logistics Information for Routine Transfers to the *Archive*

All elements in this section are REQUIRED for Data Sets that are expected to be routine, automated transmissions to the *Archive* from the *Producer*. This information is required for the *Archive* to establish and maintain the automated ingest and archive procedures. Questions 1 through 5 in Section 4 above are also required for automatic submissions.

1. Provide the mechanisms used to transfer digital data to the *Archive*. For routine, repeated submissions include the server, location, and protocol used.

NODC will retrieve a copy of each file via FTP protocol.

Server: COMMS01/COMMS02

Location: Silver Spring, MD

Account: archive

Account password can be obtained by contacting the NDBC IT Helpdesk at 228-688-1415.

Note that the above FTP account is the same account that is being used currently by NODC to obtain NDBC C-MAN and Weather Buoy archive files. The files will be found in the “NDBC/HFradar/rtv” directory.

2. List any relevant Interface Control Document, Memorandum of Understanding, or other technical documents outlining how data will be transferred from *Producer* to *Archive*.

This document will stand on its own.

3. Describe the submission schedule in terms of starting/ending times and submission frequency for each submission session.

The monthly archive will be ready for NODC archival at 0Z on the third Thursday of each month. Submission will include all data from the previous month. It may also include possible corrections/updates for earlier months which will be distinguished by having a new checksum value in the table of contents (TOC) document.

4. Give the volume of each submission session and the total anticipated volume per day or month in bytes.

720 MB and 8640 files per month, 8.6 GB and 105,120 files per year

5. List the steps in the transfer process from *Producer* to *Archive*.

The NODC archive(s) servers will routinely query the FTP account for table of contents files. When a TOC file is found the files will be copied to the archive(s) and verified using the md5 checksum.

Verification is accomplished by comparing the md5 checksum file hex string to the corresponding one contained in the TOC file.

NODC will notify NDBC only if negative issues arise. The NDBC IT helpdesk can be contacted at 228-688-1415.

6. List the *Producer's* preference for basic file validation routines (e.g. checksums, CRC32, MD5 or other).

md5sum [OPTION] --check [FILE]

7. Does the *Producer* request a periodic record of receipt from the *Archive* for purposes of tracking the submitted data?

Not required

8. List any security requirements needed during submission from the *Producer* to the *Archive*.

Not required

9. Is the content of each submission session considered by the *Producer* to be a continuation or new version of a previous submission, or is the content of each submission session considered by the *Producer* to be an independent or stand-alone collection of data?

Continuation

## Section 6 – Archive Appraisal and Justification Information

Only in cases where a formal archive appraisal package is required by the *Archive* in order to gain management approval to provide archival services for this Data Set are these elements required. For these cases, also ensure the following questions have been answered: all of Section 2, and Section 3 questions 1 and 2. The Point of Contact for the *Archive* will provide additional guidance with this section.

1. What are the cost considerations for long-term maintenance of the Data Set? Are resources available for archiving and providing access to these records?

A budget is available

2. Has this Data Set ever physically resided at a scientific data center or center of data where stewardship was provided? Where does it reside now? What scientific expertise would best provide stewardship for this Data Set?

This data is independently processed at SIO, NDBC and Rutgers University. While there may be minor differences in the near real time datasets due to latencies in configuration updates or data telemetry, they are considered to be redundant.

3. Where does this Data Set fit within NOAA's mission?

This data set supports NOAA's mission of Science, Service and Stewardship by providing HF radar observations to the public. It directly supports the NOAA Goal of Resilient Coastal Communities and Economies.

4. What is the value (scientific, public, government) of this Data Set in terms of current and anticipated future benefits?

Maps of ocean surface currents have been identified as cross-cutting observational tools that aid a range of scientific and societal applications, including ecological studies, tracking the fate and transport of pollutants, oil spill response, assessment of beach water quality, search and rescue, maritime operations and tracking changes in ocean climate.

Remote sensing of surface ocean velocity from shore-based HF radar sites bridges the operational observational gap between point samples obtained from in-situ sampling and synoptic scale relatively low resolution data obtained from satellites by providing continuous

mesoscale coverage at relatively high resolution near the coast. These broad scale and relatively high temporal and spatial resolution data are providing new insight into nearshore ocean dynamics.

5. Does the Data Set have legal mandates which require its archive at NOAA? Are there existing NARA disposition schedules that pertain to these records? If yes, please describe.

No

6. Is the Data Set unique? If not, where else does it exist?

While they aren't copies, datasets that are considered redundant for near real-time applications exist at SIO and Rutgers University.

7. Is the Data Set related to other records in a NOAA *Archive* (i.e. an extension, a new version, improved quality, etc.)? If yes, to what degree does this Data Set add value to other data sets held by NOAA or others?

Yes, it is related to (derived from) the radial velocity and range-series datasets. This dataset is the lowest level of data that provides usable surface ocean current maps for direct application without a need for further processing or interpretation.

8. Has the Data Set undergone user evaluation and/or scientific peer review, been used extensively in publications, and/or subjected to other appraisal processes? If yes, please describe.

No

9. What is the current storage media for the Data Set? If in electronic format, does it still exist on other media (e.g. paper, film)? If yes, is it required to maintain copies on other media?

Electronic, no other media

10. Does appropriate hardware and software technology exist to enable usability of the Data Set? If yes, please describe.

There are many applications available that handle NetCDF and ASCII files.

11. Does the Data Set have intrinsic value? Intrinsic value implies that an object containing data has value beyond the data content in the object. For example, the original deck logs from the HMS *Beagle* have intrinsic value, but the digitized observations from those logs do not because the digitized files are easily copied viewed, and/or redistributed.

No

The signatures below indicate the belief that the information contained on this form is true and correct to the best understanding of the *Producer* and *Archive*. These signatures also acknowledge that in the future, this information may be amended, updated, or revised as necessary and that some submissions may require management level approvals before archival services can be provided.

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Point of Contact for the *Producer*  
Printed Name and Date:

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Point of Contact for the *Archive*  
Printed Name and Date:

## **Radial Velocity Data Files**

(V1.3, Revised 01/2009)

FORM APPROVAL PENDING

Following the definitions and principles of the *Open Archival Information System (OAIS) Reference Model (ISO 14721:2003)*, this form documents the mutual understanding between a *Producer*, defined as a person or organization who provides information to be preserved, and an *Archive*, defined as the organization that intends to preserve information for access and use over the long term. It should accompany all data submissions to the National Oceanographic Data Center (NODC) and be completed to the extent possible.

The information contained on this form may be used to:

1. Populate NODC's Accession Tracking Data Base and product-specific databases
2. Create metadata records conforming to the Content Standard for Digital Geospatial Metadata (CSDGM), Vers. 2 (FGDC-STD-001-1998) and/or ISO 19115
3. Generate a formal archive appraisal package, for submissions requiring management level approval
4. Develop a list of *Producer* requirements requested of the *Archive*

The information contained on this form is true and correct to the best understanding of the *Producer* and *Archive* at the time of its submission. In the future, this information may be amended, updated, or revised as necessary and some submissions may require management level approvals before archival services can be provided.

### Instructions:

This form is divided into six sections. Section 1 provides only the most basic Tracking Information and is the only section absolutely required at the time of submission. **However, within 1 month all submissions must also include information for Section 2**, which provides basic Data Discovery and Usage Information, and all submissions should strive to provide information through Sections 3 and 4, which provide more comprehensive and detailed information on the data set and its requirements for long term stewardship. Section 5 is required for submissions to the *Archive* that are expected to be periodic or routine in nature, and supports automation of archival services. Section 6 is optional and is only required for submissions that are expected to need management level approval and a formal archive appraisal package. The *Archive* Point of Contact will provide guidance as needed on all of these questions and will work with the *Producer* to ensure both parties reach a mutual understanding.

When complete, please email the signed form (see the last page of the document) to the *Archive* Point of Contact with a copy to [NODC.DataOfficer@noaa.gov](mailto:NODC.DataOfficer@noaa.gov). Closing the email with "Signed," followed by your name is an acceptable form of signature.

## Section 1 – Basic Tracking Information

All elements in this section are REQUIRED, and will enable the *Archive* to establish a unique and durable tracking number known as an NODC Accession Number for the submission. It also clearly establishes whether the *Archive* is able to freely redistribute the data, and if not, what the restrictions are. When appropriate, the *Producer* will be provided the Accession Number in a confirmation receipt, along with the web address where the *Producer* can access the data set. When Section 1 is complete, the submission is considered “Initialized”.

1. Date of submission of this form (or its update):

2 September 2014 or date of update

2. Describe the scope of this data submission information.

This SIF covers the archiving of the HF radar radial files at NODC. These data will be retrieved from NDBC via automated processes and archived monthly.

3. What is the Data Set title? A useful title includes a listing of two or three of the observed variables, the name of one or two of the platforms used to collect data or the project responsible for the data collection activity, the location, and the range of observation dates. For example, “Temperature, salinity, and nutrient data from bottle casts from the *Akademic Korolev*, *Alpha Helix*, *Polar Star*, and *Surveyor* in the Bering and East Siberian Seas from 1987-1999.”

Surface ocean radial velocity data obtained by HF radar from stations located along coastal waters of the continental U.S., Puerto Rico and the Virgin Islands, Hawaii, Alaska. Atlantic and Gulf coast data will start from October 2008. Pacific coast data will start from September 2009, Hawaii data starts from July 2010, Puerto Rico and USVI starts from January 2010, Alaska-N. Slope data from August 2010 (seasonal), Gulf of Alaska - May 2007 (NODC Accession XXXXXXX)

Once the archiving process commences, the title of the individual accessions will be:

Surface ocean radial velocity data obtained by HF radar from stations located along coastal waters of the continental U.S., Puerto Rico and the Virgin Islands, Hawaii, Alaska YYYY-MM-DD to YYYY-MM-DD (NODC Accession XXXXXXX)

4. Primary Point of Contact for *Producer* – please provide name, organization, position, address, telephone, fax, and e-mail address.

Mark Otero  
Marine Physical Laboratory  
Programer/Analyst  
LJ, Isaacs Hall, 335  
8855 Biological Grade  
La Jolla, CA 92037  
(858) 822-3537  
motero@ucsd.edu

5. Primary Point of Contact for *Archive* – please provide name, organization, position, address, telephone, fax, and e-mail address.

Tom Ryan  
NESDIS/NODC/DBMD  
Oceanographer  
Building: SSMC3 Routing Code: E/OC1  
Silver Spring, MD 20910-3282  
Phone: 301-713-3272 x 129 Fax: 301-713-3302  
Email: [thomas.ryan@noaa.gov](mailto:thomas.ryan@noaa.gov)

6. Can NODC freely and openly redistribute this dataset? If no, list the *Producer's* constraints of the Data Set in the *Archive* for Users in terms of:
- a. User access to the Data Set
  - b. Uses of the Data Set by Users

NODC may freely distribute the data to the public without restriction.

## Section 2 – Basic Data Discovery and Usage Information

All elements in this section are REQUIRED if applicable and allow the *Archive* to enable users to find, access, and use the data described by this submission. It is strongly recommended that this information be provided at the time of the submission though it is acceptable if some elements are provided within **one month** of Initialization. When Section 2 is complete, the submission is considered “Active”.

1. What is the purpose for collecting this Data Set?

Surface ocean radial velocity data are the source from which surface ocean real time (total) vectors are produced. By archiving radial velocities, total velocity solutions can be recomputed with advances in algorithms and quality control. Radial velocity data are commonly used in research and model assimilation.

2. Provide a general descriptive abstract about the Data Set.

Maps of ocean surface currents have been identified as cross-cutting observational tools that aid a range of scientific and societal applications, including ecological studies, tracking the fate and transport of pollutants, oil spill response, assessment of beach water quality, search and rescue, maritime operations and tracking changes in ocean climate.

High frequency (HF) radar systems measure the speed of ocean surface currents in directions radial to the antenna in near real time. The resulting surface ocean radial velocities are combined with radial velocities collected by neighboring stations with overlapping coverage to produce real time (total) velocities. Systems operate continuously in all weather conditions and are installed near the coastline. Depending on the desired horizontal resolution of measured currents, the systems are capable of measuring currents anywhere from a 40 to 200 km offshore. Velocities are measured in the upper 0.3 - 2.5 meters of the ocean depending on the operating frequency. Remote sensing of surface ocean velocity from shore-based HF radar sites bridges the operational observational gap between point samples obtained from in-situ sampling and synoptic scale relatively low resolution data obtained from satellites by providing continuous mesoscale coverage at relatively high resolution near the coast.

3. What is the time period covered by the Data Set?

October 2008 (Atlantic and Gulf coasts) through present; September 2009 (Pacific coast) through present. Hawaii data starts from July 2010, Puerto Rico and USVI starts from January 2010, Alaska-N. Slope data from August 2010 (seasonal), Gulf of Alaska - May 2007

4. What is the geospatial coverage of the Data Set (Easternmost longitude, westernmost longitude, northernmost latitude, southernmost latitude)? Note western longitudes and

southern latitudes are negative, and use decimal degrees if possible.

west = -174.1174  
east = -61.0056  
north = 74.0862  
south = 14.5

5. List the measured variables or parameters in the Data Set (e.g., Temperature, Salinity, etc.)

Longitude, Latitude, U comp, V comp, X Distance, Y Distance, Range, Bearing, Velocity, Direction

6. List the platform(s) from which the Data Set is derived.

Fixed Coastal Stations -  
<https://docs.google.com/a/noaa.gov/spreadsheet/ccc?key=0AscNsxJAZOw5dHE4WWtodW9WaWxzcmYwVHd2QzFfSEE&usp=sharing>

7. List the instrument(s) used to derive the Data Set.

[CODAR Ocean Sensors Ltd's SeaSonde](#), [Wellen Radar \(WERA\)](#),  
[Least Expensive Radar \(LERA\)](#)

8. List the observation types in the Data Set (e.g., Biological Data, Physical Data, etc.).

Physical

9. List the mission/project name(s) to which the Data Set contributes.

U.S. National Integrated Ocean Observing System HF Radar Network

10. Give the expected size(s) in bytes and number of files in the submission.

208,334 files and 41 GB month; 2.5 million files and 490 GB year

11. Give the file format and format version (e.g., netCDF-3, HDF-5, ASCII CSV, etc.).

ISO-8859 text

12. Does this Data Set conform to any file-level data content or metadata content standards? (e.g., COARDS/CF, HDF-EOS, WOCE, GHRSSST)

Yes, this dataset does contain documented formatted metadata which allows for automated data extraction. Relevant documents are:

**[HFRNet National Network WERA Radial LonLatUV \(LLUV\) file format 1.0, Jan 10 2008 \(HFRNet\\_WERA\\_LonLatUV\\_RDL.pdf\)](#)**

**[SeaSonde Radial Site Release 6 CODAR Table Format, Apr 18, 2009](#)**

**[SeaSonde Radial Site Release 7 LLUV 1.12 File Format, Mar 20, 2013](#)**

13. Please describe the file contents. Include enough information to make these data understandable to future users. For example, a table containing as applicable: parameter definition, data type, byte size/length, scale factor, offset, precision, and units. This information is especially important for ASCII and other formats which are not self-describing like netCDF and HDF. If this information is already contained in a file or file headers included in this submission, please indicate the file name.

Longitude, (deg)  
Latitude, (deg)  
U comp (cm/s)  
V comp, (cm/s)  
X Distance, (km)  
Y Distance, (km)  
Range, (km)  
Bearing, (True)  
Velocity, (cm/s)  
Direction, True

14. Give the file-naming convention for the file(s) to be submitted, with the range/domain of each field value in the filename.

file type = RDL(radial)  
antenna pattern = Only available for CODAR systems -i refers to ideal antenna pattern, m (measured antenna pattern)  
Affiliation Code = character code; typically 2 - 10 characters but up to 20 are allowed.  
site identifier = character site identifier ; Typically 3 - 4 characters but up to 25 are allowed  
YYYY = Year  
MM = Month

DD = Day  
HHmm = Hour minute  
HFR national network file type

Example file - RDL\_i\_ODU\_LISL\_2013\_08\_01\_2000.hfrss10lluv

RDL = radial

i = i refers to ideal antenna pattern, other possible values are m (measured antenna pattern)

ODU = Affiliation code (ODU refers to Old Dominion University)

LISL = site identifier

2013 = YYYY

08 = MM

01 = DD

2000 = HHmm

hfrss10lluv = HFR national network file type

15. Please provide a list of existing reports, publications, user guides, web sites, or other supporting documentation relevant to the Data Set.

**[HFRNet National Network WERA Radial LonLatUV \(LLUV\) file format 1.0, Jan 10 2008 \(HFRNet\\_WERA\\_LonLatUV\\_RDL.pdf\)](#)**

**[SeaSonde Radial Site Release 6 CODAR Table Format, Apr 18, 2009](#)**

**[SeaSonde Radial Site Release 7 LLUV 1.12 File Format, Mar 20, 2013](#)**

**The Integrated Ocean Observing System High-Frequency Radar Network: Status and Local, Regional, and National Applications**

**Marine Technology Society Journal, MTS, November/December 2010 Volume 44 Number 6**

**[Download Article](#) (pdf)**

**[National HF Radar Technical Steering Team Position Paper on Use of HF Radar in Freshwater](#) (pdf)**

**[National HF Radar Technical Steering Team Position Paper on Use of HF Radar for Wave Measurement](#) (pdf), Aug 2012**

**[High Frequency Radar 101 Presentation](#) (pdf)**

**[High-Frequency Radar for Ocean Surface Current Mapping: Best Practices](#) (pdf)**

[Mapping Surface Currents around U.S. Coasts \(pdf\)](#)

[Bibliography of HF Radar Comparisons with Other Sensors \(pdf\)](#)

[IOOS and U.S. Coast Guard Search and Rescue Responsibilities \(pdf\)](#)

[Search and Rescue Operations \(SAROPS\) Environmental Data Sources: Their Uncertainties \(pdf\)](#)

[IOOS HF Radar Data and Its Use by the U.S. Coast Guard for Search and Rescue \(pdf\)](#)

[CODAR SeaSonde QA/QC Remote Monitoring Checklist \(pdf\)](#)

[CODAR SeaSonde QA/QC Setup and Diagnostics \(pdf\)](#)

16. What metadata exists for this Data Set? Is it in a standard format/can it be automatically translated into a standard format? Describe the granularity of this metadata (For example, is it collection level metadata? If not, to what file or grouping of files does it apply?)

[Self documenting ISO-8859 text](#)

17. If applicable, describe the temporal resolution of the primary parameter(s) in the Data Set.

[Typically one but sometimes two files per hour per site](#)

18. If applicable, describe the horizontal resolution of the primary parameter(s) in the Data Set.

[The natural coordinate system for radial velocities measured by HF radar is polar. As a result, horizontal resolution varies in bearing from hundreds to thousands of meters as a function of range. Range resolution is fixed for a given file but varies among sites based on operating configuration from 200 m to 12 km.](#)

19. If applicable, describe the vertical resolution of the primary parameter(s) in the Data Set.

[NA](#)

20. If applicable, describe the projection grid or coordinate system used in the Data Set.

WGS84

21. If the Technical Contact for the *Producer* is different from the Primary Contact for the *Producer* (1.4), please provide name, organization, position, address, phone, fax, and email.

Rex Hervey  
Organization: NWS/OOS/NDBC/EB  
Position Title: Meteorologist  
1007 Balch Blvd (NDBC) Room: 327  
Building: 3203 Routing Code: W/OPS51  
Stennis Space Center, MS 39529-6000  
Phone: 228-688-3007  
Fax: 228-688-3153  
Email: rex.hervey@noaa.gov

22. If the Metadata Contact for the *Producer* is different from the Primary Contact for the *Producer* (1.4), please provide name, organization, position, address, phone, fax, and email.

Same as primary

23. If the Technical Contact for the *Archive* is different from the Primary Contact for the *Archive* (1.5), please provide name, organization, position, address, phone, fax, and email.

**John Relph**  
**Organization: NODC**  
**Position:**  
**Address: SSMC 3, 4<sup>th</sup> floor, OC3**  
**1315 East-West Highway**  
**Silver Spring, MD 20910**  
**Phone: 301-713-3284**  
**Email: John.Relph@noaa.gov**

24. If the Metadata Contact for the *Archive* is different from the Primary Contact for the *Archive* (1.5), please provide name, organization, position, address, phone, fax, and email.

Same as primary contact

### Section 3 – Detailed Data Processing and Quality Information

All elements in this section are STRONGLY RECOMMENDED and allow the *Archive* to enable more complete and thorough understanding of the data over the long term.

1. What is the overall completeness and quality of the Data Set?

Complete and of high quality

2. Describe the data processing level of the Data Set. For example, is the Data Set unprocessed or minimally processed, quality controlled or calibrated, etc.? For satellite data, is it Level 0, 1, 2, 3, or 4?

Radial velocities are computed from direct measurements of radar backscatter or sea echo by individual HF radar sites. Automated quality control measures are used throughout processing.

3. Summarize the science algorithms(s) used to derive the Data Set.

The radial surface ocean current speed is determined using linear wave theory and the Doppler shift obtained from spectral analysis of the measured radar backscatter time-series. CODAR SeaSonde systems use direction finding to locate the signal bearing while the range to the signal is determined by frequency modulation. WERA and LERA systems use phased arrays and beam forming to control sampling in bearing. Processing module versions and parameters used in computing radial velocities are provided by metadata in each file.

4. Describe the steps taken to process the Data Set, including for each step the methodology, source data, and time/frequency, and listing any input data sets used to derive the Data Set.

[CODAR processing summary](#)

[REMOTE SENSING OF SURFACE CURRENTS AND WAVES BY THE HF RADAR WERA](#)

LERA systems follow the same general processing as WERA

Radial velocities are collected continuously from HF radar sites through the U.S. HF Radar Network.

5. Describe the Data Set's dependency on other data (e.g. ancillary files), processing systems, software, or entities that are not to be submitted to the Archive.

This dataset is derived from HF radar backscatter Doppler spectra. Proprietary vendor software is used to create this dataset.

6. Detail any measures taken by the Producer to assess the quality of the Data Set, including data comparisons, and an assessment of the attribute accuracy. Give information about

omissions, selection criteria, and other rules used to derive the Data Set.

Comparisons and validation of HF Radar based measurements of ocean surface velocity are compiled in a [bibliography of HF Radar Comparisons with Other Sensors \(pdf\)](#)

**Ohlmann, Carter, Peter White, Libe Washburn, Brian Emery, Eric Terrill, Mark Otero, 2007: Interpretation of Coastal HF Radar–Derived Surface Currents with High-Resolution Drifter Data. *J. Atmos. Oceanic Technol.*, 24, 666–680.**  
**doi: <http://dx.doi.org/10.1175/JTECH1998.1>**

Quality control is described in the following documents:

[CODAR SeaSonde QA/QC Remote Monitoring Checklist \(pdf\)](#)

[CODAR SeaSonde QA/QC Setup and Diagnostics \(pdf\)](#)

[High-Frequency Radar for Ocean Surface Current Mapping: Best Practices \(pdf\)](#)

[HF Radar Network Near-Real Time Ocean Surface Current Mapping](#)

7. List any quality assessment parameters included in the Data Set. For example, this may be an explanation of quality flags and their range/domain of values.

Quality assessment parameters are provided for CODAR systems in the document '[SeaSonde Radial Site Release 7 LLUV 1.12 File Format](#)' (Mar 20, 2013). WERA and LERA systems are documented in '[HFRNet National Network WERA Radial LonLatUV \(LLUV\) file format 1.0](#)' (Jan 10 2008).

## Section 4 – Data Stewardship Information

All elements in this section are STRONGLY RECOMMENDED and enable the *Archive* to provide more comprehensive *data stewardship* over the long term. Data stewardship requires a more extensive set of functions than traditional long-term preservation of data and information, and includes activities such as monitoring the needs of user communities, compliance testing, quality assurance, and use of this Data Set in larger integrated product databases. Importantly, this section provides the *Producer* with an opportunity to request specific services from the *Archive*. This document does not imply that all of these services will be provided, but typically the *Archive* will work to meet them on a best-effort basis.

1. Please describe any quality control or quality assurance procedures the *Archive* should perform on this Data Set when it is submitted to the *Archive*. How will the *Producer* provide updates to the *Archive* when changes occur in the Data Set, transmission mechanism, format, content, etc.? How often might such changes be expected to occur?

Check for completeness of transmission and notify provider if problems occur.

2. Does the *Producer* request reports on the *Archive*'s dissemination of the Data Set? If so, what statistics should be included? (Please note federal regulations strictly limit the amount and kind of information that can be recorded by federal agencies.)

Yes, please provide all available statistics.

3. Does the *Producer* request standards compliance testing on the Data Set? For example, should the *Archive* verify data files are meeting netCDF Climate and Forecast (CF) conventions, or should metadata records be checked for adherence to the FGDC content standard? Will the *Producer* perform standards compliance testing prior to submission to the *Archive*?

No

4. Suggest action(s) for the *Archive* in the case of an error in transmission (e.g. missing data, duplicate data, incorrect file name or size, failure of compliance checks).

Check for completeness of transmission and notify provider if problems occur.  
a. Check for package completeness (manifest check with versions)

5. Please list any known NODC product databases (e.g. World Ocean Data Base) that this Data

Set should become a part of.

All Applicable

6. Please identify one or more Representative Users of the *Designated Community*. The Designated Community is defined in the OAIS Reference Model as the group of potential users who should be able to understand a Data Set over the long term. The *Archive* works specifically to preserve the data and information for this Designated Community.
  - a. Describe this user community and their requirements
  - b. Provide Contact Information for a representative of this community - please provide name, organization, position, address, telephone, fax, and e-mail address

None

7. List security requirements for dissemination of the Data Set from the *Archive* to the users.

None required

8. Once the Data Set is transferred to the *Archive*, how long should it take for it to become searchable? How long should it take to become accessible online?

Within 24 hours

9. Describe any preferred search criteria to be enabled for this Data Set in the *Archive* (e.g., search by time, search by geographic bounding box on a Polar Stereographic map, etc.)

No preference

10. Describe any the preferred access mechanisms to be enabled for this Data Set in the *Archive* (e.g., OPeNDAP, Web Coverage Services, FTP, etc.)

No preference

## Section 5 – Logistics Information for Routine Transfers to the *Archive*

All elements in this section are REQUIRED for Data Sets that are expected to be routine, automated transmissions to the *Archive* from the *Producer*. This information is required for the *Archive* to establish and maintain the automated ingest and archive procedures. Questions 1 through 5 in Section 4 above are also required for automatic submissions.

1. Provide the mechanisms used to transfer digital data to the *Archive*. For routine, repeated submissions include the server, location, and protocol used.

NODC will retrieve a copy of each file via FTP protocol.

Server: COMMS01/COMMS02

Location: Silver Spring, MD

Account: archive

Account password can be obtained by contacting the NDBC IT Helpdesk at 228-688-1415.

Note that the above FTP account is the same account that is being used currently by NODC to obtain NDBC C-MAN and Weather Buoy archive files. The files will be found in the “NDBC/HFradar/radial” directory.

2. List any relevant Interface Control Document, Memorandum of Understanding, or other technical documents outlining how data will be transferred from *Producer* to *Archive*.

This document will stand on its own.

3. Describe the submission schedule in terms of starting/ending times and submission frequency for each submission session.

The monthly archive will be ready for NODC archival at 0Z on the third Thursday of each month. Submission will include all data from the previous month. It may also include possible corrections/updates for earlier months which will be distinguished by having a new checksum value in the table of contents (TOC) document.

4. Give the volume of each submission session and the total anticipated volume per day or month in bytes.

208,334 files and 41 GB month; 2.5 million files and 490 GB year

5. List the steps in the transfer process from *Producer* to *Archive*.

The NODC archive(s) servers will routinely query the FTP account for table of contents files. When a TOC file is found the files will be copied to the archive(s) and verified using the md5 checksum.

Verification is accomplished by comparing the md5 checksum file hex string to the corresponding one contained in the TOC file.

NODC will notify NDBC only if negative issues arise. The NDBC IT helpdesk can be contacted at 228-688-1415.

6. List the *Producer's* preference for basic file validation routines (e.g. checksums, CRC32, MD5 or other).

md5sum [OPTION] --check [FILE]

7. Does the *Producer* request a periodic record of receipt from the *Archive* for purposes of tracking the submitted data?

Not required

8. List any security requirements needed during submission from the *Producer* to the *Archive*.

Not required

9. Is the content of each submission session considered by the *Producer* to be a continuation or new version of a previous submission, or is the content of each submission session considered by the *Producer* to be an independent or stand-alone collection of data?

Continuation

## Section 6 – Archive Appraisal and Justification Information

Only in cases where a formal archive appraisal package is required by the *Archive* in order to gain management approval to provide archival services for this Data Set are these elements required. For these cases, also ensure the following questions have been answered: all of Section 2, and Section 3 questions 1 and 2. The Point of Contact for the *Archive* will provide additional guidance with this section.

1. What are the cost considerations for long-term maintenance of the Data Set? Are resources available for archiving and providing access to these records?

A budget is available

2. Has this Data Set ever physically resided at a scientific data center or center of data where stewardship was provided? Where does it reside now? What scientific expertise would best provide stewardship for this Data Set?

This data is independently collected at SIO, NDBC and Rutgers University. While there may be minor differences in the near real time datasets due to latencies in configuration updates or data telemetry, they are considered to be redundant.

3. Where does this Data Set fit within NOAA's mission?

This data set supports NOAA's mission of Science, Service and Stewardship by providing HF radar observations to the public. It directly supports the NOAA Goal of Resilient Coastal Communities and Economies.

4. What is the value (scientific, public, government) of this Data Set in terms of current and anticipated future benefits?

We anticipate that this dataset will help advance quality control of radial velocity data as well as provide new methods for combining radials from overlapping sites to produce total velocities. We also expect that radial velocities will be used directly for model assimilation to improve ocean circulation model nowcasts and forecasts.

5. Does the Data Set have legal mandates which require its archive at NOAA? Are there existing NARA disposition schedules that pertain to these records? If yes, please describe.

No

6. Is the Data Set unique? If not, where else does it exist?

While they aren't copies, datasets that are considered redundant for near real-time applications exist at SIO and Rutgers University.

7. Is the Data Set related to other records in a NOAA *Archive* (i.e. an extension, a new version, improved quality, etc.)? If yes, to what degree does this Data Set add value to other data sets held by NOAA or others?

Yes, it is related to (derived from) radar backscatter Doppler spectra. This dataset is the first surface ocean velocity product produced by an HF radar system for measuring surface currents. Radial velocities from different sites with overlapping coverage are combined to produce maps of surface ocean vector velocity.

8. Has the Data Set undergone user evaluation and/or scientific peer review, been used extensively in publications, and/or subjected to other appraisal processes? If yes, please describe.

No

9. What is the current storage media for the Data Set? If in electronic format, does it still exist on other media (e.g. paper, film)? If yes, is it required to maintain copies on other media?

Electronic, no other media

10. Does appropriate hardware and software technology exist to enable usability of the Data Set? If yes, please describe.

In addition to proprietary vendor software, there are many applications available that handle NetCDF and ASCII files.

11. Does the Data Set have intrinsic value? Intrinsic value implies that an object containing data has value beyond the data content in the object. For example, the original deck logs from the HMS *Beagle* have intrinsic value, but the digitized observations from those logs do not because the digitized files are easily copied viewed, and/or redistributed.

No

The signatures below indicate the belief that the information contained on this form is true and correct to the best understanding of the *Producer* and *Archive*. These signatures also acknowledge that in the future, this information may be amended, updated, or revised as necessary and that some submissions may require management level approvals before archival services can be provided.

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Point of Contact for the *Producer*  
Printed Name and Date:

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Point of Contact for the *Archive*  
Printed Name and Date: