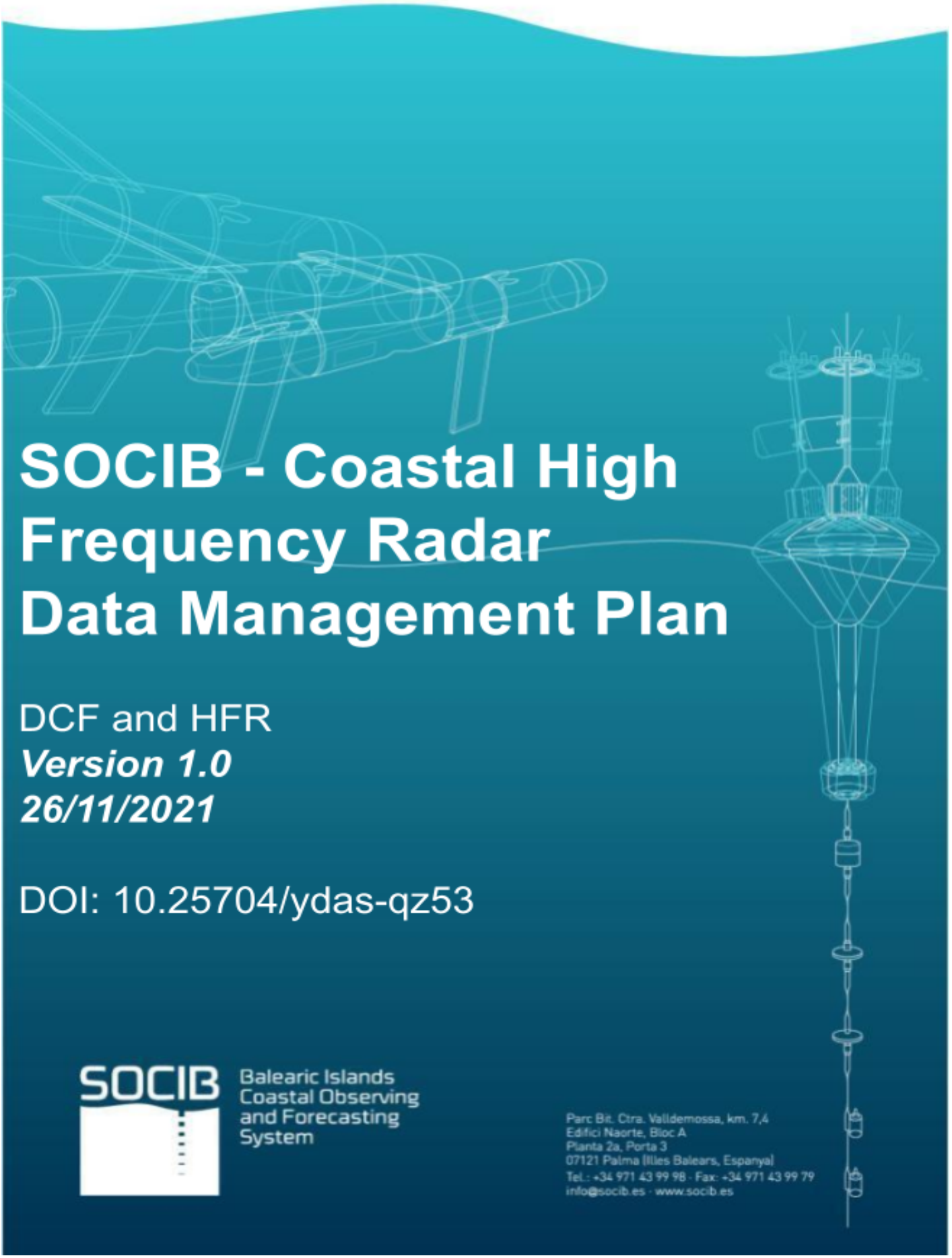

SOCIB - Coastal High Frequency Radar Data Management Plan

DCF and HFR

Version 1.0

26/11/2021

DOI: 10.25704/ydas-qz53

SOCIB
Balearic Islands Coastal Observing and Forecasting System

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List of Acronyms

CMEMS-INSTAC: Copernicus Marine Environment Monitoring Service In Situ Thematic Centre

CSIC: Spanish National Research Council (from the Spanish, Centro Superior de Investigaciones Científicas)

DCF: Data Center Facility

DM: Delayed mode

DMP: Data Management Plan

DOI: Digital Object Identifier

EMODnet: European Marine Observation and Data Network

ETD: Engineering Technology Development

EU: European

FAIR: Findability, accessibility, interoperability, and reusability (data principles)

FORM: Formentera HFR site name

GALF: Puig des Galfi HFR site name

HFR: High Frequency Radar

IFE: Ibiza Front-End

IREP: Internal Report

IT: Information Technology

NA: Non Applicable

netCDF: Network Common Data Form

OBP: Ocean Best Practices

OMA: Open-boundary Modal Analysis

OPeNDAP: Open-source Project for a Network Data Access Protocol

PUM: Product User Manual

QR: Qualitas Remos

QuID: Quality Information Document

RT: Real Time (equivalent to near-real time at SOCIB).

SOCIB: Balearic Islands Coastal Ocean Observing and Forecasting System (from the Spanish, Sistema de Observación y predicción Costero de las Illes Balears)

THREDDS: Thematic Real-time Environmental Distributed Data Services

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1. Introduction

The SOCIB High Frequency Radar (HFR) Data Management Plan (DMP) describes the data management life cycle for the HFR data, collected, processed and/or generated by SOCIB. It also includes the HFR data curation, preservation and the description of the data flows from SOCIB to the operational European HFR node, which acts as focal point for HFR data management and distribution to the main marine data portals (CMEMS-INSTAC, SeaDataNet and EMODnet).

The objective of the HFR-DMP is to improve the day-to-day handling of the HFR, creating a more transparent, collaborative, and sustainable communication system both internally and with the end users.

The SOCIB DMP template was established by reviewing and harmonizing existing SOCIB DMPs and others available in the international framework (IODE, ORD, ANDS, IMOS, NANOOS). This approach seeks the convergence and the alignment with the main actors in the global scene, also assuring the implementation of Ocean Best Practices (OBPs) procedures across the value chain.

By following the recommendations provided by DIGITAL CSIC, it has also fostered the SOCIB's data integration in the CSIC repository, pursuing a greater impact of research results to address future challenges. This document also benefits from the achievements realised within several projects (e.g. CMEMS-In Situ TAC, INCREASE, SeaDataCloud, JericoNEXT, AtlantOS, EuroSea) with regard to HFR data management and the building of an integrated data system of systems. It is also aligned with the ongoing efforts in JERICO S3 and the related DMP for coastal platforms, following the roadmap established by the EuroGOOS HFR Task Team for promoting the HFR technology and its applications in Europe, being also based on recommendations from the EuroGOOS Data Management, Exchange, and Quality Working Group (DATAMEQ), seeking convergence**.** The template aims to meet the requirements of different observing programs and platforms with the necessary flexibility and adaptability allowing the stakeholders to design a customized workflow, responding to their needs.

2. Goals

The DMP is based on the SOCIB ARCHIVE "rules":

- **A**pply to other institution
- **R**espond to internal needs
- **C**over FAIRness recommendation
- **H**andle data lifecycle with simplicity
- **I**dentify tasks, roles & responsibilities
- **V**isualize crucial information
- **E**mphasize platform information

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3. Observing program information

This section provides an overview of the SOCIB-Coastal High Frequency Radar observing program, series and platforms that are providing continuous, near real-time and consistent long-term coastal ocean surface current maps in the Ibiza Channel. The table below also includes discovery information on funding, responsible institutions and people as well as contributors.

Program name	Balearic Islands Coastal Observing and Forecasting System - Coastal High Frequency Radar [SOCIB_HFR]
Series name and EDIOS series ID	High Frequency Radar network of the Ibiza Channel [HFR-Ibiza]
Platform name	HFR radial site from Ibiza (Puig des Galfi) [GALF] HFR radial site from Formentera (Cap de Barbaria) [FORM]
Data product Identifier (DOI)	https://doi.org/10.25704/17GS-2B59
Funding information	Ministerio de Ciencia e Innovación (http://www.ciencia.gob.es/) Govern de les Illes Balears (http://www.caib.es/) Consejo Superior de Investigaciones Científicas (https://www.csic.es/en)
Program description	Continuous coastal ocean surface current maps in the Ibiza Channel measured by High-Frequency Radars (HFR)
Program Website	https://socib.es/?seccion=observingFacilities&facility=radar
Institution	**SOCIB (Sistema de Observación y Predicción Costero de las Islas Baleares)**
Institution URL	https://www.socib.es/
Principal Investigator	Emma Reyes
Principal Investigators email	ereyes@socib.es
Creator Name	HFR facility, Data Center Facility
Creator email	hfr_ibiz@socib.es, data.centre@socib.es
Creator URL	https://www.socib.eu/index.php?seccion=observingFacilities&facility=radar, http://www.socib.es/?seccion=dataCenter
Contributor names	Joaquín Tintoré, Arancha Lana, Julien Marmain, Vicente Fernández, Benjamín Casas
Contributor email	jtintore@socib.es, alana@imedea.uib-csic.es, julien.marmain@degreane-horizon.fr, vicente.fernandez@eurogoos.eu, bcasas@socib.es
Contributor role	Project Leader, RelatedPerson, RelatedPerson, RelatedPerson, RelatedPerson
Acknowledgements	Ministerio de Ciencia e Innovación (http://www.ciencia.gob.es/). Govern de les Illes Balears (http://www.caib.es/). Consejo Superior de Investigaciones Científicas (https://www.csic.es/en)
Operation	
Information spreadsheet	HFR Operation and Maintenance (2021-2024)
Communication channels	Informal communication are provided through different channels

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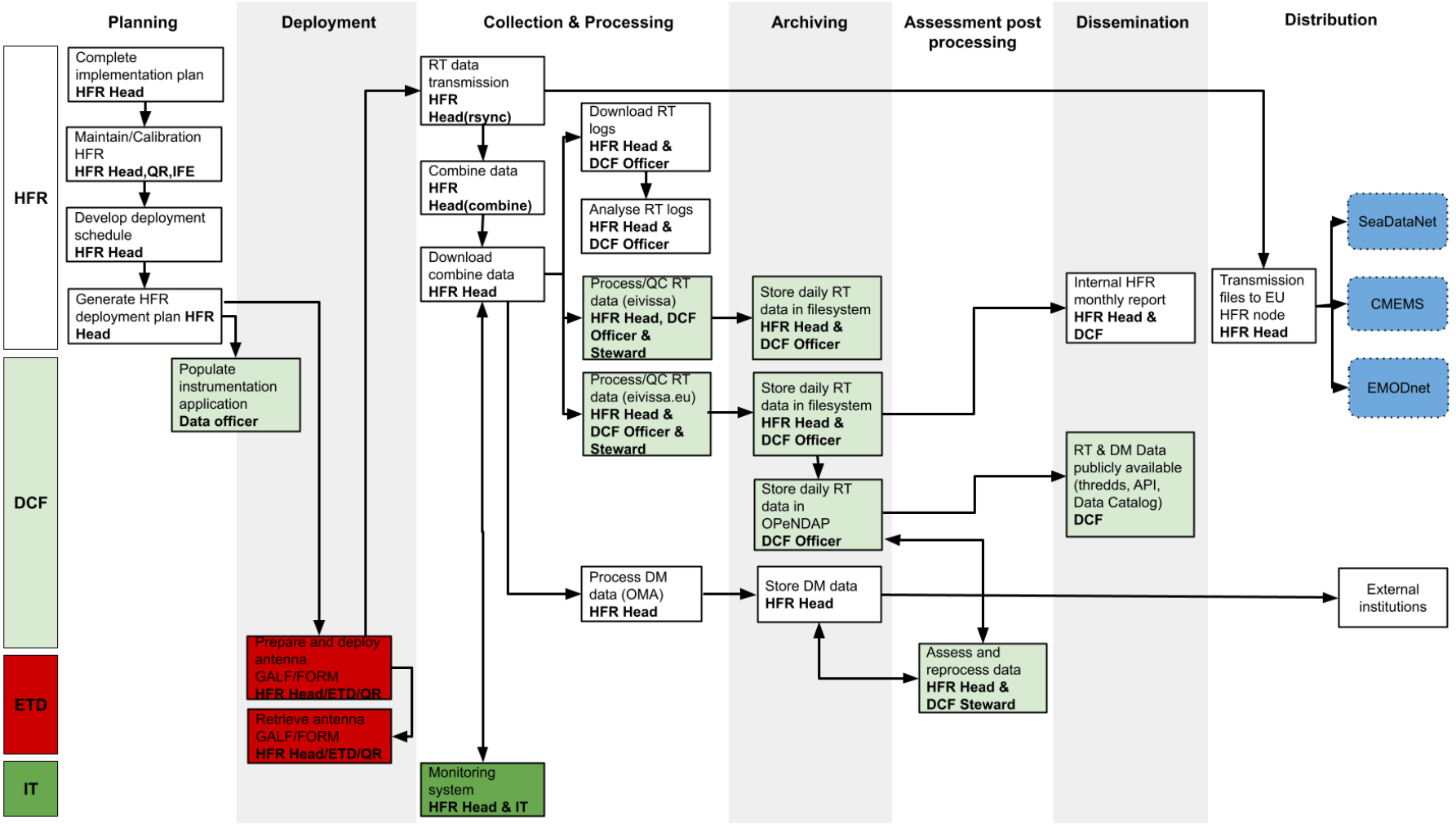
4. Workflow diagram



The diagram shows the workflow of the Coastal High Frequency Radar Observing Program. The project consists of continuous coastal ocean surface current maps in the Ibiza Channel measured by High-Frequency Radars (HFR). Distribution to the European aggregator is a responsibility of the HFR node (highlighted in blue within the diagram).

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5. Workflow information

The table below describes how the different tasks along the data value chain are being done. People in charge of the tasks, their sequence, their frequency as well as the available resources (e.g documents, software, tools) are also shown.

Phase	Operation step	Frequency	Description	Operator	Resources
Planning	Complete implementation plan	Every 9 months	The step includes the approvals from the local/national authorities.	HFR Head	
	Maintain HFR (on-site)	Every 24 or 1 months	BIANNUAL: The major *in situ* High Frequency Radar (HFR) system is checked every 6 months (twice a year) by the subcontractor Qualitas Remos (QR). MONTHLY: A minor monthly check is carried out by the Ibiza front-end in collaboration with the HFR head. Daily remote checks are being performed by the HFR head.	HFR Head, QR, and Ibiza front-end	OBPs: JERICO_NEXT_Deliverable_2.4_final (Public) Database for MONTHLY reports (Private) Database for BIANNUAL reports (Private)
	Calibrate HF Radar	Every 2 years	The instrument is calibrated in collaboration with the Engineering and Technology Development (ETD) division.	HFR Head & ETD	OBPs: JERICO_NEXT_Deliverable_2.4_final (Public)
	Generate and develop deployment plan	Every 2 years	Plan is based on the HF Radar station calibration.	HFR head	
Deployment	Prepare HFR for deployment	According to project/observing program	The in situ deployments of the antennas are prepared.	HFR Head, QR & ETD	
	Populate instrumentation application database	Every new deployment	The Data Center Facility (DCF) officer proceeds with the activation of the instrument and relative sensors, states, variables and calibrations on the instrumentation application database.	DCF Data Officer	SPEC_DCF_instrumentation-database-naming-convention (Private)

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	Deploy HFR	According to system calibration	The antennas are installed. Each radar station needs the metadata record to be installed and checked.	HFR Head, DCF, QR & ETD	
	Retrieve HFR	NA	The system is already in place, information is being measured and is ready to be synchronized with SOCIB	HFR Head, DCF,QR & ETD	
Collection & Processing	Transmit RT from Radial Sites to the central station (COMBINE)	Every 15 minutes	Radials transmission.	HFR Head	Data Flow Doc. Section 2.1 (Private)
		Hourly (on the 25 minute mark)	Diagnostic transmission.		
		Hourly (on the 30 minute mark)	Waves transmission.		
	Transfer RT data	Hourly (on the 59 minute mark)	Data are transferred from the central station to rawInput (from radar_system_eivissa and radar_system_eivissa.eu).	HFR Head (COMBINE)	Data Flow Doc. Section 3.1 (Private)
	Download RT logs	Hourly (on the 59 minute mark)	Diagnostic files (logs) are created for each run.	HFR Head (COMBINE)	Data Flow Doc. Section 3.1 (Private)
	Process RT data (eivissa)	Every 10 minutes	Files are processed and quality controlled & flagged with the SOCIB's Processing Application from rawInput before the raw files are moved, to rawArchiveDaily.	HFR Head & DCF Data officer & Steward	Data Flow Doc. Section 3 (Private) QUID_DCF_SOCIB-QC-procedures (Public) PUM_DCF_processing-application-user-manual (Private)
	Proces RT data (eivissa.eu)	Every 15 minutes	Files are processed and quality controlled & flagged with the HFR Toolbox from rawInput before the raw files are moved, to rawArchiveDaily.	HFR Head & DCF Data officer & Steward	Data Flow Doc. Section 3 (Private) JRadar manual (Public)
	Store daily RT data	Hourly	Files are stored (along the day) in rawArchiveDaily before those files are moved to rawArchive.	HFR Head & DCF Data officer	Data Flow Doc. Section 3 (Private)
	Analyse RT logs	Every 10 minutes	Currently this analysis is being performed occasionally. In the	HFR Head	Data Flow Doc. Section 3

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			future, logs will be monitored in RT.		(Private)
		Every 15 minutes			Data Flow Doc. Section 4 (Private)
	Monitor HF Radar	Continuously Remote checkings (daily and weekly basis)	Zabbix monitors the HFR-IBIZA (sites and central station) system continuously Zabbix monitors the HFR-IBIZA processing system (3 types of warning every 15 minutes) Rs_warn monitors the HFR radial sites every hour (5 minutes past the hour every hour) Remote checklists Weekly remote checks are being performed by the subcontractor (information is provided in quarterly reports).	HFR Head &IT (Zabbix)	Templates available in OBPs report (Appendix II) (Public) Quarterly reports from the remote weekly test (Private)
	Process DM data	Occasionally	OMA data products are being kept updated. Aggregated NetCDF are produced on demand for research purposes.	HFR Head	OMA generation programs (Public)
Archiving	Store RT	Every 15 minutes	Radials transmission. (COMBINE)	DCF Data officer	
		Hourly (on the 25 minute mark)	Diagnostic transmission.(COMBINE)		
		Hourly (on the 30 minute mark)	Waves transmission. (COMBINE)		
	Store RT combine products	Hourly	Files are stored from Combine to the coexisting folders in SOCIB archive system.	HFR Head (COMBINE) & DCF Data Officer	
	Store raw RT products (eivissa.eu)	Hourly	Files are transferred from Combine to the raw INPUT archive system. Those are temporarily stored.	HFR Head (downloading.sh) & DCF Data officer	

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	Store raw RT products in filesystem	Hourly	RT data are archived (ARCHIVE) in the filesystem immediately after the temporary files are processed.	HFR Head (CodarHfRadar.java) & DCF Data officer	
	Store raw RT products in filesystem	Hourly	Daily RT data are archived (ARCHIVE_DAILY) in the filesystem immediately after the temporary files are processed.	HFR Head (CodarHfRadar.java) & DCF Data officer	
	Store map image	Hourly	The map image from the last total vector is stored in the filesystem.	HFR Head (COMBINE)	
	Store netCDF products	Hourly	RT daily files are stored in the folder linked to the public OPENDapp	DCF Data officer	
	Store DM products in filesystem	Hourly	OMA nowcast: HFR gap-filled hourly data (*.mat format). Continuously generated, distributed and shared on request, not operational dissemination.	HFR Head	
	Execute back up	Every 6 months	Backup of files at bi-annual basis is carried out.	HFR Head (support from IT operator if needed).	Backup_procedure (Private)
Assessment & post processing	Assess and reprocess RT data	On demand (by email)	Monthly (or the agreed periodicity with the facility), snapshots (minor versions) RT data products are reprocessed only if the QA reports errors.	HFR Head & DCF Data steward	
	Assess and reprocess DM data	On demand (by email)	OMA data products (DM) are reprocessed on demand (as requested by the facility). A separate data product (different DOI) with DM or higher processing levels could also be considered.	HFR Head & DCF Data steward	
Dissemination	Generate QuID report	Monthly	A technical report is produced on a monthly basis and it is available in the SOCIB web page.	HFR Head & DCF	PROCEDURE: Checklist_HFR (Private) REPORTS: HFR monthly reports (Public) SOCIB web page
	Publish netCDF	Hourly	RT files are published on the SOCIB Thredds Data Server	DCF	PUM_DCF_SOCIB-insitu-m

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	files		(OPeNDAP).		easurements-netcdf-format-manual (Private) SOCIB THREDDS Data Server (Public) SOCIB list of variables (Private)
	Aggregate RT Data	Hourly	After datasets (RT) are processed, Ibiza HF Radar aggregation from L1 product files are disseminated in the SOCIB Thredds Data Server (OPeNDAP).	DCF	Aggregated RT data (Public)
	Share DM files	On demand (by email)	DM data products (OMA) are shared for research purposes only under request.	HFR Head	
	Publish & update DOI	Every 3 months (with a delay of 3 months)	SOCIB data products are collections of datasets wrapped together to represent the outcome of certain observation programs, campaigns and projects. The HFR data products are disseminated in the SOCIB data catalog with the corresponding Digital Object Identifiers (DOI). For data-products with DOIs,the available versions of the data-products are also exposed to facilitate its download.	HFR Head & DCF Technical	SOCIB Data Catalog - HF-Radar-Ibiza Landing Page (Public) SOCIB Data Catalog - Product User Manual (Public)
Distribution	Push data to the EU HFR Node	Hourly	Files are synchronized in RT directly from the HFR radial sites and pushed to the EU HFR Node. Data are therefore available for external users on different infrastructures (i.e. CMEMS-INSTAC, SeaDataNet and EMODnet Physics).	HFR Head (HFR Toolbox)	Guideline on how to synchronize the HFR data with the European HFR node (Public) IREP_DCF_data-dissemination-report_DMPr (Private)

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6. Data process

This section focuses on the flow of HFR processed data and information, in terms of data format and type, inputs and outputs, as well as the tools and technologies used. Both, real time (RT) and delayed (DM) data modes are considered.

Mode	Data flow step	Data format Input	Data format Output	Type Input	Type Output	Tools and Technologies
RT	Acquisition	CSQ_ naming (*.cs)	CSS_ naming (*.cs)	Cross spectra Series	Cross Spectra Short-time	data not synchronized with central station - just back up
		CSS_ naming (*.cs)	RDLi, RDLm (*ruv)	Cross Spectra Short-time	Radials	rsync [from Radial Sites to Central Station]
		CSS_ naming (*.cs)	STAT_*.rdt	Cross Spectra Short-time	Radial Diagnostics	
		CSS_ naming (*.cs)	WVLM_ or wave model list output (*.wls)	Cross Spectra Short-time	Waves	
	Transfer to rawInput	RDLi, RDLm	RDLi, RDLm	Radials	Radials	radar_downloading.sh [from Central Station to SOCIB's file system > rawInput]
		TOTL	TOTL	Totals	Totals	
	Processing (eivissa)	RDLi, RDLm,TOTL	NetCDF	Radials, Totals	L0, L1	Processing Application (CodarHFRadar parsing function)
	Processing (eivissa.eu)	RDLi, RDLm	NetCDF	Radials	Euro HFR Node NetCDF format	HFR Toolbox (JRadar)
		TOTL		Totals		
	Archiving	RDLi, RDLm	RDLi, RDLm	Radials	Radials	HFR Toolbox (JRadar)
		TOTL	TOTL	Totals	Totals	HFR Toolbox (JRadar)
	Organization	RDLi, RDLm,TOTL	RDLi, RDLm,TOTL	Radials, Totals	Radials, Totals	Organizer
DM	Processing	RDLi, RDLm	oma_ (*.mat) oma_ (*.nc)	Radials	OMA_nowcasts (gap-filled data)	hfrprogs
	Reprocessing	RDLi, RDLm	oma_ (*.mat) oma_ (*.nc)	Radials	OMA_nowcasts (gap-filled data)	hfrprogs

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7. Contacts

This section includes the list of SOCIB's facility/service contributing to the tasks included in the workflow and their contact information.

Facility	Role	Name	Email
HFR	HFR Head	Emma Reyes	hfr_ibiz@socib.es
	Qualitas Remos	Ángel Gil	info@qualitasremos.com
		Macu Ferrer	
	Ibiza Front-end	Manel Sánchez	manel.sanchez.riera@gmail.com
DCF	DCF Head	J. Gabriel Fernandez	data.centre@socib.es
	DCF Data Officer	Miquel Àngel Rújula	
	DCF Data Steward	Matteo Marasco	
	DCF Data Technical	Xisco Notario	
ETD	ETD Support	Niko Wirth	etd@socib.es

8. Future improvements

In the future, SOCIB plans to improve the DMP as follow:

- Include guideposts, protocols, services and tools
- Support and improve the reusability, accessibility and discoverability of the HFR data.

9. How to cite

When using this Data Management Plan, please use the following citation:

Marasco, M., Reyes, E., Fernández, J.G., Charcos, Notario, X., M., Rotllán, P., Rújula, M.A., Tintoré, J. (2021). SOCIB - Coastal High Frequency Radar Data Management Plan (Version 1.0). Balearic Islands Coastal Observing and Forecasting System, SOCIB. https://doi.org/10.25704/ydas-qz53

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