

CI/CS WORKSHOP

THE COMMUNITY TOGETHER



Research**SOC**



CI CoE PILOT

ConOps Office Hours:

Go to menti.com and use code **38 73 60 6**

Go to [menti.com](https://www.menti.com) and use code **38 73 60 6**

Rafael Ferreira da Silva: ConOps

CI CoE Pilot – <https://cicoe-pilot.org>

rafsilva@isi.edu – <https://rafaelsilva.com>

USC Information Sciences Institute

www.isi.edu

Resources

- CI CoE Pilot: ConOps Overview
<https://cicoe-pilot.org/materials/videos>
- Some ConOps Standards
 - IEEE 1362-1998 (most popular)
 - ANSI/AIAA G-043-1992 (a bit outdated)
 - DI-IPSC-81430
 - USDOT Federal Highway Administration CONOPS Template
- MITRE Best Practices
<https://bit.ly/2Q5BSN1>

Go to **menti.com** and
use code **38 73 60 6**

ConOps Objectives

- Provide **end-to-end traceability** between operational needs and captured source requirements
- Establish a **high-level basis for requirements** that supports the system over its life cycle
- Establish a **high-level basis for test planning** and system-level test requirements
- Support the generation of **operational analysis models** (use cases) to test the interfaces
- Provide the basis for computation of system capacity
- Validate and discover implicit requirements

ConOps Development

- First step in engineering life cycle
- Every ConOps is a **living** and unique document requiring input from all **stakeholders**
- ConOps should answer the following basic questions:
 - **Who** are the stakeholders involved with the system?
 - **What** are the known elements and high-level capabilities of the system?
 - **Why** does your organization lack that the system will provide?
 - **Where** is the system located (geographically and physically)?
 - **When** each activity will be performed (time-sequence)?
 - **How** will the system be designed and built (with what resources)?

Go to **menti.com** and
use code **38 73 60 6**

My Suggested Structure for a ConOps Document

- Cover Page
- Record of Reviews and Changes
- Table of Contents
- Document Contents
- Notes
- References
- Appendices
- Glossary
- Acronyms

Go to **menti.com** and
use code **38 73 60 6**

My Suggested Structure for a ConOps Document

- Document Contents
 - Executive Summary
 - Missing and Capabilities
 - Operational Organization
 - Current Situation (or System)
 - Proposed System
 - Operations and Support Description
 - Operational Scenarios

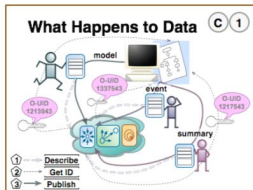
4. Section C: Creating New Products

With the changes submitted by his colleagues, the global access flag he added to publish information just to the laboratory, and the configuration changes he added for the new data inputs, Dr. Chu is ready to run his software. As he starts running the software, although he doesn't fully appreciate it, the CI is performing a lot of steps to make sure the products show up where they are expected.

4.1 Configuring the System to Accept Data Products

Just as Dr. Chu received pointers to subscribe to specific resources, his colleagues Dr. Jones and Dr. Istaitov received resource descriptors when configuring the code to publish its observational events and summary data. To obtain this publication resource, the collaborators had to enter information into a publication metadata form that describes the source and nature of their publications. These metadata descriptions help users learn more about data products, assist administrators to troubleshoot any problems, and allows the CI to create a processing history for each of the data products. They are also critical to supporting search functions for the products created by the CI. Because the forms use drop-down menus with controlled vocabularies to fill out most of the fields, and auto-population of subfields based on user selections, all of the members of the team fill out the metadata form consistently and quickly.

When the software runs, it uses the publication resources to announce to the CI that it is the source of this particular observational event, data stream, or data set. The CI can then connect the people or systems who have sought out and requested these observational events or data.



ConOps Example: OOI (CI Science User)

- Operational Scenarios
- Written in layman's terms, as non-technical as possible
- Diagrams that explain the flow of the operational scenario
- Does not provide
 - Operating concept
 - Assumptions and constraints
 - Potential Impacts

https://www.researchgate.net/publication/273321441_OOI_Cyberinfrastructure_Science_User_Concept_of_Operations

Go to **menti.com** and
use code **38 73 60 6**

CI/CS WORKSHOP

ResearchSOC

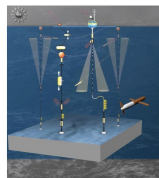
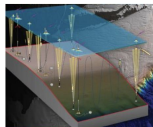
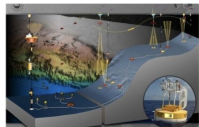
CI CoE PILOT



Ocean Observatories Initiative



Concept of Operations



ConOps Example: OOI

- Outdated public version of ConOps as a presentation
 - Good structure of ConOps document based on the IEEE standard
 - Examples of data flows and products
 - Should not have: discussion regarding budgetary information

http://oceanobservatories.org/wp-content/uploads/AnnualReview_OOI_ConOps_2015-03-03-03_ver_1-00.pdf

Go to **menti.com** and
use code **38 73 60 6**

CI/CS WORKSHOP



1 Scope of Document	1
2 Services for Observatory Operations	1
2.1 LSSTCam Prompt Processing Services	2
2.1.1 Scope	2
2.1.2 Overview	2
2.1.3 Operational Concepts	3
2.2 LSSTCam Archiving Service	7
2.2.1 Scope	7
2.2.2 Overview	7
2.2.3 Operational Concepts	8
2.3 Spectrograph Archiving Service	9
2.3.1 Scope	9
2.3.2 Overview	9
2.3.3 Operational Concepts	10

ConOps Example: LSST

- Follows DHS style for ConOps documentation
 - Focused on defining operational scenarios and detailed **operational concepts**
 - Hard to separate ConOps from OpsCon document

<https://docushare.lsst.org/docushare/dsweb/Get/LDM-230>

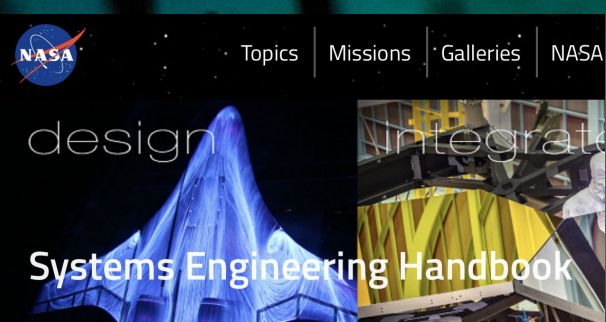
Go to **menti.com** and
use code **38 73 60 6**

ConOps Example: NISAR

- Mix of the following concepts into a single document:
 - Science and Applications
 - Mission Science Requirements
 - Mission Design and CONOPS
 - Flight System Characteristics
 - Radar and Measurement Principles
 - Data Products
 - Revisions include errata corrections and some updates

https://nisar.jpl.nasa.gov/files/nisar/NISAR_Science_Users_Handbook.pdf

Go to **menti.com** and
use code **38 73 60 6**



ConOps Example: NASA

Concept of Operations Annotated Outline

<https://www.nasa.gov/seh/appendix-s-concept-of-operations>

CI/CS WORKSHOP

Go to **menti.com** and
use code **38 73 60 6**

Cover Page

Table of Contents

1.0 Introduction

1.1 Project Description

This section will provide a brief overview of the development activity and system context as delineated in the following two subsections.

1.1.1 Background

Summarize the conditions that created the need for the new system. Provide the high-level mission goals and objective of the system operation. Provide the rationale for the development of the system.

1.1.2 Assumptions and Constraints

State the basic assumptions and constraints in the development of the concept. For example, that some technology will be matured enough by the time the system is ready to be fielded, or that the system has to be provided by a certain date in order to accomplish the mission.

1.2 Overview of the Envisioned System

This section provides an executive summary overview of the envisioned system. A more detailed description will be provided in Section 3.0

1.2.1 Overview

This subsection provides a high-level overview of the system and its operation. Pictorials, graphics, videos, models, or other means may be used to provide this basic understanding of the concept.

1.2.2 System Scope

This section gives an estimate of the size and complexity of the system. It defines the system's external interfaces and enabling systems. It describes what the project will encompass and what will lie outside of the project's development.

2.0 Documents

2.1 Applicable Documents

This section lists all the documents, models, standards or other material that are applicable and some or all of which will form part of the requirements of the project.

2.2 Reference Documents

This section provides supplemental information that might be useful in understanding the system or its scenarios.

3.0 Description of Envisioned System

This section provides a more detailed description of the envisioned system and its operation as contained in the following subsections.

3.1 Needs, Goals and Objectives of Envisioned System

This section describes the needs, goals, and objectives as expectations for the system capabilities, behavior, and operations. It may also point to a separate document or model that contains the current up-to-date agreed-to expectations.

3.2 Overview of System and Key Elements

This section describes at a functional level the various elements that will make up the system, including the users and operators. These descriptions should be implementation free; that is, not specific to any implementation or design but rather a general description of what the system and its elements will be expected to do. Graphics, pictorials, videos, and models may be used to aid this description.

**See you at 1PM EST for
CI/CS Workshop's
Panel: Ups and Downs of Cloud
Computing in Open Science**