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## Summary Report:

# Results of the Second OOI Community Survey on Data Delivery Systems conducted by the Data Systems Committee of the Ocean Observatories Initiative Facility Board

**Important Note:** This survey was designed and conducted by the OOIFB / DSC. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the OOIFB and do not necessarily reflect the views of the National Science Foundation.

## 1 Introduction

In 2019, the Ocean Observatories Initiative Facility Board (OOIFB) Data Delivery and Cyberinfrastructure (DDCI) Committee conducted a community survey to determine how the NSF's Ocean Observatories Initiative (OOI) could better serve data to users. In response to the feedback received from this first survey and to recommendations from the DDCI, the OOI data management team developed the Data Explorer, a refined and more capable interface for finding and downloading OOI data. This new system was launched in October 2020. About six months after the Data Explorer launch, the OOIFB Data Systems Committee (DSC), which succeeded the DDCI, recognized the value of a second community survey. One primary purpose of the second survey was to evaluate the user experience with Data Explorer and to assess the extent to which this system and other OOI data systems are meeting the needs of the user community.

## 2 Survey Methodology

A web-based survey was designed with multiple branch points, so that a set of questions were served to all respondents, and then another set was only served to respondents who used the Data Explorer system. Likewise, questions specific to each of the five data delivery subsystems evaluated—Data Explorer, OOI Net/Data Portal, ERDDAP, Machine to Machine (M2M), Raw Data Archive, and IRIS—were only served to respondents who indicated that they have used these systems. The survey was available to the OOI community from December 9, 2021 to January 28, 2022 and the responses were anonymous. Sixty-two respondents completed the second survey. Forty-eight self-identified as coming from the user community and 14 self-identified as from the non-user community.

### 3 Key Survey Takeaways

A few of the questions in the 2022 survey were formulated so that they could be compared to questions in the 2019 survey. Key among them was the question about how the systems under review have been meeting user needs in a general sense, on a scale of 1 to 10, with 1 being “not at all” and 10 being “completely”. Because the number of respondents was different for each data system, the results for each system in each year are normalized so they can be compared to one another. We produced a “heat map” of the data with the color scale representing the normalized percent of users answering a particular way. In 2019, with 127 total survey participants responding (Figure 1), IRIS users were very satisfied, while Raw Data Server users were only moderately satisfied. Data Portal users reported low satisfaction overall amongst a wider range of satisfaction levels. M2M users indicated a broad range of satisfaction levels. ERDDAP users were mostly moderately satisfied, but significant numbers were either unsatisfied or very satisfied. We interpret this as most users likely used the ERDDAP system, but did not appreciate the lack of data available through ERDDAP at the time of the survey.

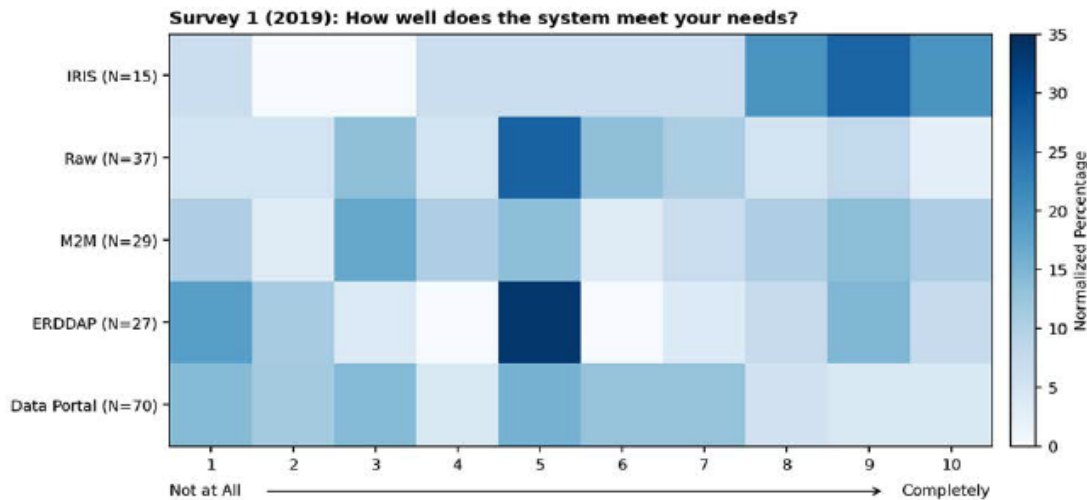


Figure 1. “Heat map” with color intensity scale representing the normalized percent of users answering a particular way for the 2019 survey

In 2021, with 62 total survey participants responding, the situation appeared to have changed significantly (Figure 2). First, this survey includes the results for the new Data Explorer system, which users generally liked. The distribution of the “meeting of needs” data shows that users are very satisfied with Data Explorer, and a more normal distribution is apparent, small sample sizes notwithstanding.

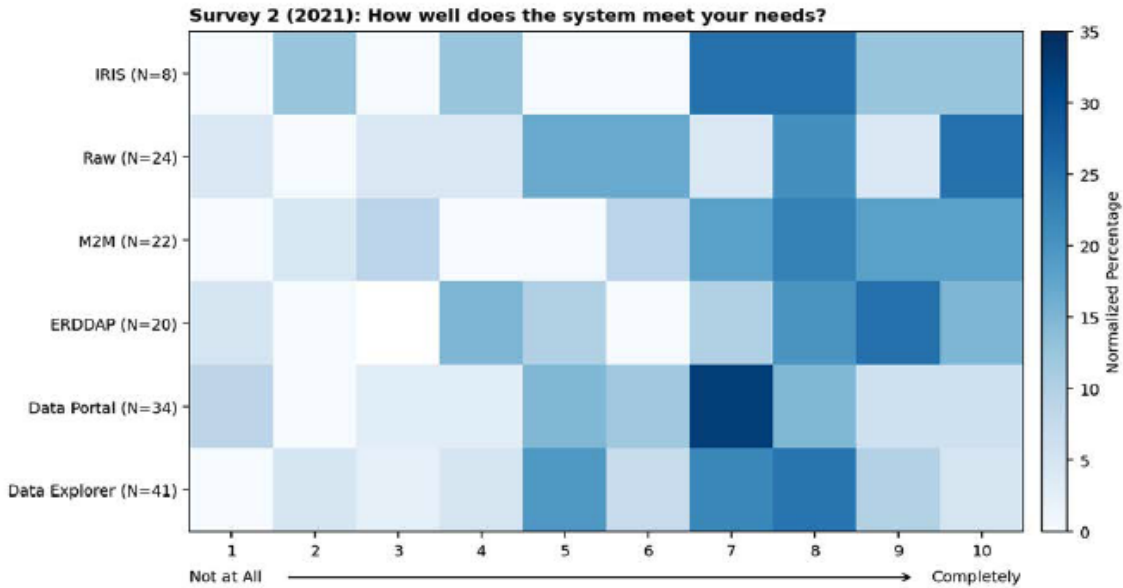


Figure 2. “Heat map” with color intensity scale representing the normalized percent of users answering a particular way for the 2021 survey.

Interesting as well, is that for the other data systems, users appear to be more satisfied with these systems across the board, including the Data Portal.

## 4 Description of the Analysis of the Survey Results

Below we present the analysis of the results of the survey for the Data Explorer, Other Data Systems, Scripted Access, Training, Help Desk, Discourse and respondent demographics.

### 4.1 Data Explorer

A large percentage of respondents were familiar with the new Data Explorer and 85 percent of them rated their overall experience with the system as being good or excellent. Very few respondents indicated a fair or poor experience.

### 4.2 Other Data Systems

Users were asked about other access methods for OOI data aside from the new Data Explorer, and 73 percent of respondents indicated that they access OOI data via OOI/Net/Data Portal. Fifty percent access OOI data via the Raw Data Server and 48 percent access it via M2M.

### 4.3 Programmatic/Scripted Access

Fifty-eight percent of respondents indicated that they access OOI data directly using programmatic methods (e.g., scripts, codes, notebooks, etc.). Users were also asked about the system they used to retrieve data for programmatic access and 33 percent reported they use ERDDAP and 40 percent use M2M. Forty-six percent of users indicated that they would like OOI data to be directly accessible from cloud object storage.

### 4.4 Training

Forty-four percent of respondents reported that they had attended a training/tutorial on the new Data Explorer. When asked what they would like future training and tutorials to cover, 56 percent of users said they would like training on advanced data access and visualization. Thirty-five percent of users would also like to receive training on the new features of OOI.

### 4.5 Help Desk and Discourse

Thirty-four percent of users indicated that obtaining user support when accessing OOI data is very or somewhat easy, and 21 percent said that obtaining user support is very or somewhat difficult. Respondents were asked where they get help regarding OOI and 40 percent indicated they get help from the OOI help desk. Forty-two percent get help from other sources and 23 percent have not needed help. Eighty-four percent of users reported that the OOI help desk responded in a timely manner and 79 percent of users shared that the OOI help desk met their needs. Sixty-seven percent of users were not aware of OOI's Community Forum on Discourse and 82 percent had never asked a question on Discourse. Of those respondents who were aware of OOI's Community Forum on Discourse and/or had asked a question on Discourse, 89 percent of those did find the information on Discourse helpful.

### 4.6 Usage

There are fairly evenly distributed levels of access to OOI data in terms of usage frequency (daily, weekly, monthly, less than monthly, and not at all). For a few of those who do not use OOI data, the data were not relevant to their work, but for most people they are simply not familiar with OOI or the data it provides, or they did not answer the question. Usage of the various research arrays is relatively evenly distributed, with the Coastal Endurance Array and the Regional Cabled Array standing out as the two arrays with most users. Survey respondents were also asked about their primary purpose of working with OOI data. Eighty-five percent of users said their primary use of OOI data was for scientific research and 42 percent reported that they use OOI data for teaching and educational purposes.

## 4.7 Demographics

Demographics were separated by users and non-users (Table 1).

Table 1. Demographics of users and non-users of OOI assets

	Research Universities	Minority Serving Universities	Government Agencies	"Other"
<b>Users</b>	77	6	6	10*
<b>Non-users</b>	64	14	14	7
	Professors	Research Scientists	Graduate Students	"Other"
<b>Users</b>	35	31	13	21
<b>Non-users</b>	57	29		14
* 4% are from K-12 schools				

## 5 Committee Recommendations

1. Users are generally quite satisfied with Data Explorer, but would like to see improvement of OOI data provenance and instrument deployment information.
2. Nearly 60% of respondents access OOI data with scripts (i.e., “programmatically”). The program should place additional focus on supporting this type of user.
3. Users are interested in having more training sessions on OOI, and requested that these training sessions focus primarily on advanced data access and visualization, as well as new features.
4. Users who use the Discourse forums appreciate this system, however most respondents are not aware of this resource. Efforts showcasing Discourse could be a fruitful area of outreach.
5. Users of M2M would like to see increased availability/visibility of documentation. The API spec should be made easily available to users, and the profiles of existing examples should be elevated.

6. Users would like to see parity, in terms of data availability, between the OOINet system and the Data Explorer.
7. The DSC is supportive of an eventual move away from OOINet to Data Explorer. However, 73 percent of users still use OOINet, and any effort to retire this system must be done through a collaborative process involving members of the community.

## 6 Conclusion

Results of the Second OOI Community Survey on Data Delivery Systems clearly show that user satisfaction with the data delivery options available to them continues to increase. The development and rollout of the Data Explorer is quite popular, and users of this system are looking forward to the continued ingestion of full-resolution data from all sensors and platforms, as well as improvements that will more clearly indicate data availability and data QC. In summary, OOI has made excellent progress on the data service issue in the two years between surveys and continues to improve.