



# WBS and Reporting Structures of the U.S. and In-Kind Contributions

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# Overview / Objectives

- Present the WBS for IceCube M&O.
- Give various views of labor resources in M&O.
- Show task-level breakdown with names and funding source.
- Explain bi-annual process of updating plan
- Describe coordination committee that plans and allocates resources.



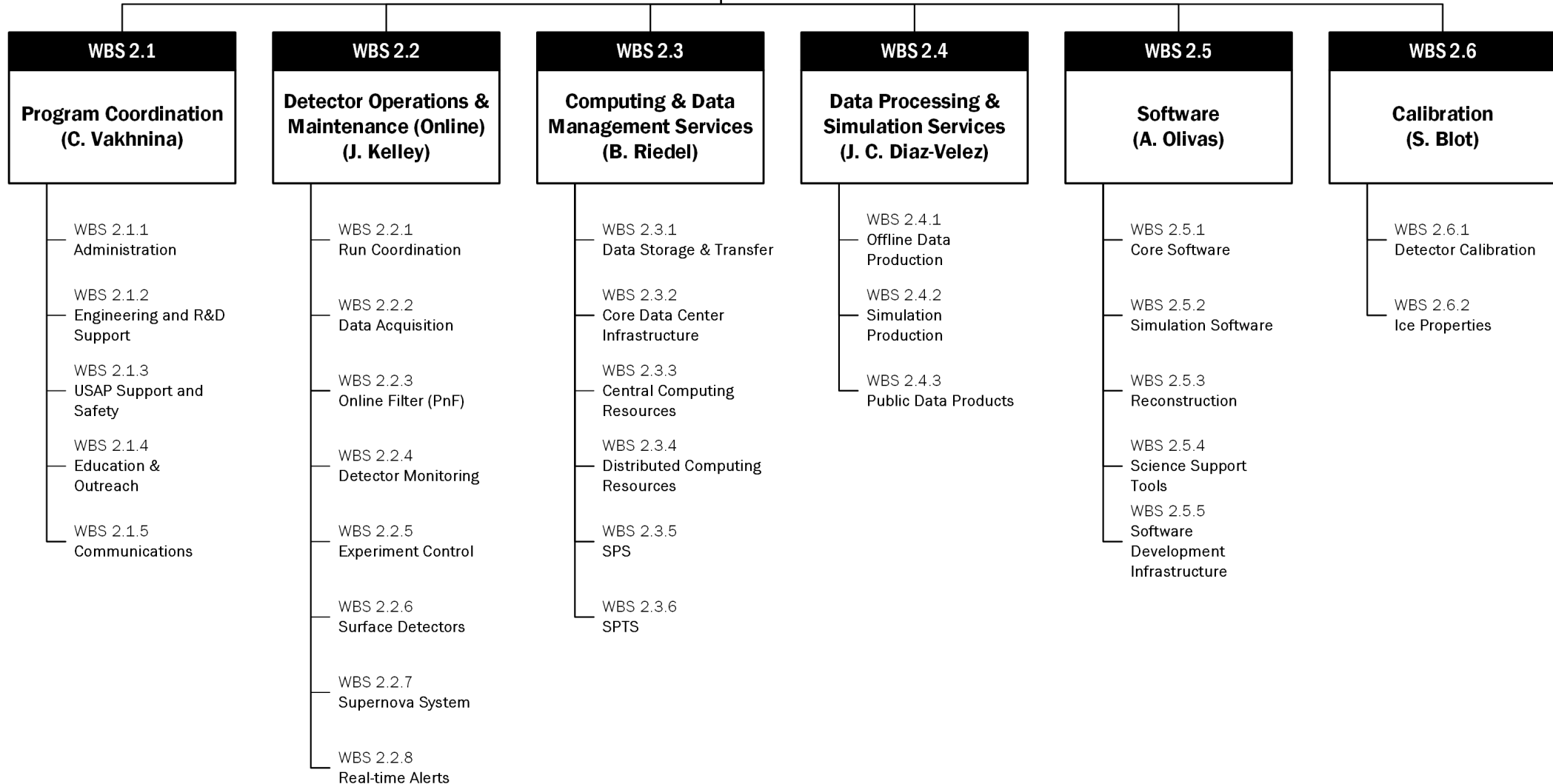
# IceCube Neutrino Observatory

F. Halzen – PI

K. Hanson – Director of Operations

A. Karle – Assoc Director for Science and Instrumentation

J. Madsen – Assoc. Director for Education and Outreach



# WBS Dictionary

IceCube Management and Operations

[WBS Dictionary](#)

Detailed IceCube M&O MoU Staffing Matrix  
by WBS and tasks

[IceCube M&O Staffing Matrix](#)

[Previous versions](#)



# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

<b>WBS L2</b>	<b>NSF M&amp;O Core</b>	<b>NSF Base Grants</b>	<b>U.S. Institutional In-Kind</b>	<b>Europe &amp; Asia Pacific In-Kind</b>	<b>Grand Total</b>
2.1 Program Management	5.08	0.40	4.26	6.40	<b>16.14</b>
2.2 Detector Operations & Maintenance	13.48	1.98	3.75	9.05	<b>28.26</b>
2.3 Computing And Data Management Services	7.85	0.05	1.38	2.00	<b>11.28</b>
2.4 Data Processing & Simulation Services	3.50	0.95	1.05	3.25	<b>8.75</b>
2.5 Software	4.05	1.90	5.93	11.15	<b>23.03</b>
2.6 Calibration	1.05	1.30	1.75	3.90	<b>8.00</b>
<b>Grand Total</b>	<b>35.01</b>	<b>6.58</b>	<b>18.12</b>	<b>35.75</b>	<b>95.46</b>

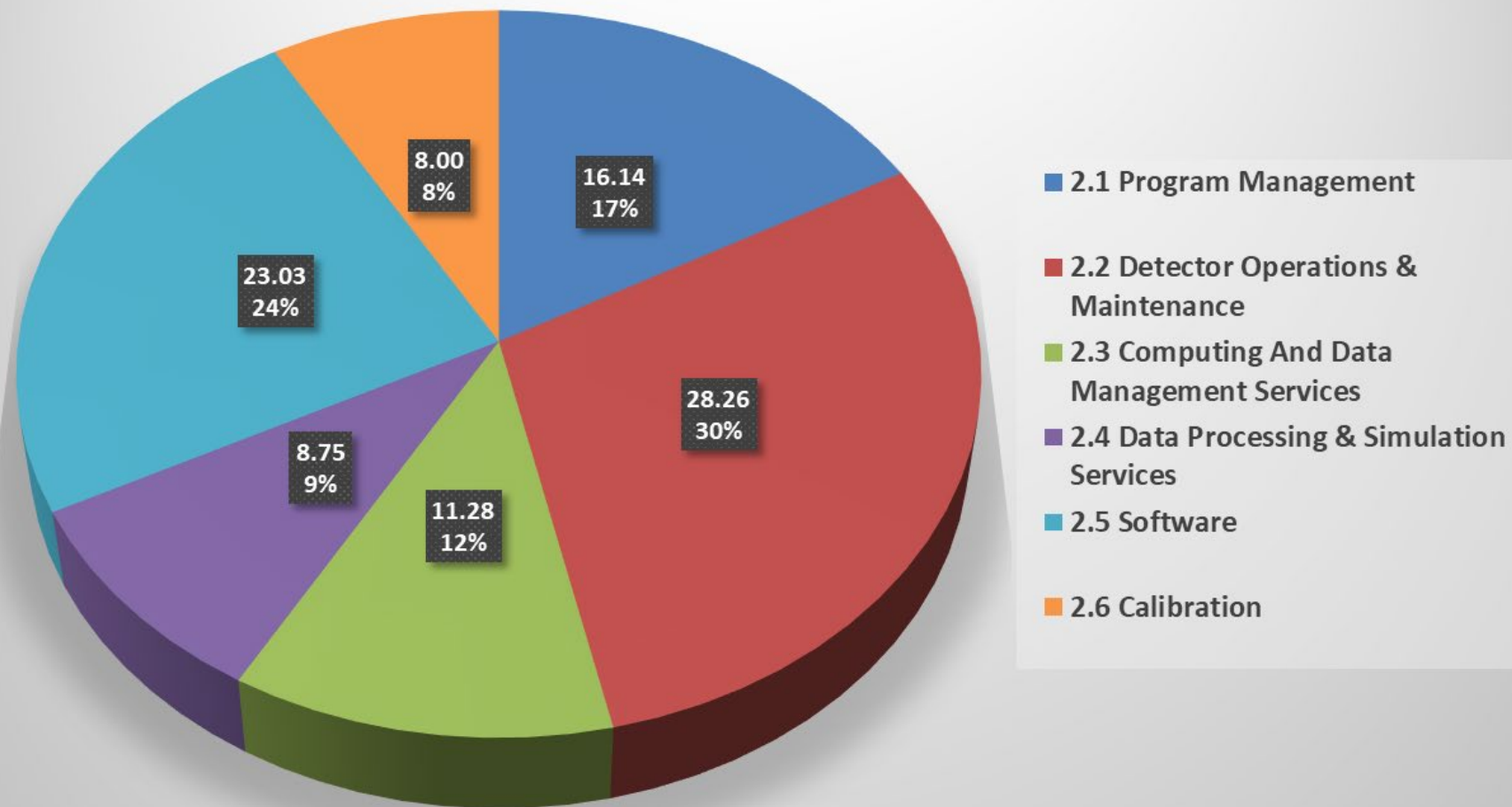
IceCube M&O MoU's are posted at:

DocuShare: <https://docushare.icecube.wisc.edu/dsweb/View/Collection-6627>



# FY2019 IceCube M&O Responsibilities

IceCube M&O Responsibilities - Overall Source of Funds (FTE)



# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.1 Program Management

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.1 Program Management	2.1.1 Administration	2.7 FTE	0.2 FTE	2.4 FTE	4.3 FTE	<b>9.6 FTE</b>
	2.1.2 Engineering and R&D Support	1.1 FTE	0.3 FTE	0.8 FTE	0.9 FTE	<b>3.1 FTE</b>
	2.1.4 Education & Outreach	0.8 FTE		1.1 FTE	1.2 FTE	<b>3.1 FTE</b>
	2.1.3 Usap Support & Safety	0.2 FTE				<b>0.2 FTE</b>
	2.1.5 Communications	0.3 FTE				<b>0.3 FTE</b>
<b>2.1 Program Management Total</b>		<b>5.1 FTE</b>	<b>0.4 FTE</b>	<b>4.3 FTE</b>	<b>6.4 FTE</b>	<b>16.1 FTE</b>

Click here for detailed [IceCube M&O MoU Staffing Matrix by WBS v25.1 2018.1218](#)



# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.2 Detector Operations and Maintenance

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.2 Detector Operations & Maintenance	2.2 Detector Operations & Maintenance	1.6 FTE			0.1 FTE	1.7 FTE
	2.2.1 Run Coordination	3.6 FTE				3.6 FTE
	2.2.2 Data Acquisition	3.2 FTE		0.5 FTE		3.7 FTE
	2.2.3 Online Filter (Pnf)	0.5 FTE	0.9 FTE	0.9 FTE	5.1 FTE	7.3 FTE
	2.2.4 Detector Monitoring	2.1 FTE	0.6 FTE	0.9 FTE	2.2 FTE	5.8 FTE
	2.2.5 Experiment Control	0.8 FTE				0.8 FTE
	2.2.6 Surface Detector Operations	1.6 FTE		0.8 FTE	1.1 FTE	3.5 FTE
	2.2.7 Supernova System			0.5 FTE		0.5 FTE
	2.2.8 Real-Time Alerts	0.3 FTE	0.5 FTE	0.3 FTE	0.6 FTE	1.6 FTE
<b>2.2 Detector Operations &amp; Maintenance Total</b>		<b>13.5 FTE</b>	<b>2.0 FTE</b>	<b>3.8 FTE</b>	<b>9.1 FTE</b>	<b>28.3 FTE</b>

Click here for detailed [IceCube M&O MoU Staffing Matrix by WBS v25.1 2018.1218](#)





# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.3 Computing & Data Management Services

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.3 Computing And Data Management Services	2.3.0 Computing And Data Management	0.9 FTE		0.1 FTE		1.0 FTE
	2.3.1 Data Storage & Transfer	2.2 FTE				2.2 FTE
	2.3.2 Core Data Center Infrastructure	1.3 FTE				1.3 FTE
	2.3.3 Central Computing Resources	0.6 FTE		1.3 FTE	1.4 FTE	3.3 FTE
	2.3.4 Distributed Computing Resources	1.6 FTE	0.1 FTE		0.6 FTE	2.3 FTE
	2.3.5 Sps Operations	0.7 FTE				0.7 FTE
	2.3.6 Spts Operations	0.6 FTE				0.6 FTE
<b>2.3 Computing And Data Management Services Total</b>		<b>7.9 FTE</b>	<b>0.1 FTE</b>	<b>1.4 FTE</b>	<b>2.0 FTE</b>	<b>11.3 FTE</b>

Click here for detailed [IceCube M&O MoU Staffing Matrix by WBS v25.1 2018.1218](#)



# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.4 Data Processing & Simulation Services

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.4 Data Processing & Simulation Services	2.4.1 Offline Data Production	0.2 FTE	0.5 FTE	0.5 FTE	1.7 FTE	<b>2.8 FTE</b>
	2.4.2 Simulation Production	3.0 FTE	0.5 FTE	0.6 FTE	1.6 FTE	<b>5.7 FTE</b>
	2.4.3 Public Date Products	0.3 FTE				<b>0.3 FTE</b>
<b>2.4 Data Processing &amp; Simulation Services Total</b>		<b>3.5 FTE</b>	<b>1.0 FTE</b>	<b>1.1 FTE</b>	<b>3.3 FTE</b>	<b>8.8 FTE</b>

Click here for detailed [IceCube M&O MoU Staffing Matrix by WBS v25.1 2018.1218](#)



# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.5 Software

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.5 Software	2.5.1 Core Software	1.7 FTE		1.1 FTE	1.1 FTE	3.9 FTE
	2.5.2 Simulation Software	1.1 FTE	0.5 FTE	1.1 FTE	2.4 FTE	5.0 FTE
	2.5.3 Reconstruction	0.6 FTE	1.5 FTE	3.4 FTE	7.3 FTE	12.8 FTE
	2.5.4 Science Support Tools			0.3 FTE		0.3 FTE
	2.5.5 Software Development Infrastructure	0.8 FTE				0.8 FTE
	2.6.2 Ice Properties				0.6 FTE	0.6 FTE
<b>2.5 Software Total</b>		<b>4.1 FTE</b>	<b>1.9 FTE</b>	<b>5.9 FTE</b>	<b>11.4 FTE</b>	<b>23.3 FTE</b>

Click here for detailed [IceCube M&O MoU Staffing Matrix by WBS v25.1 2018.1218](#)





# FY2019 M&O Responsibilities

## By WBS and Funds, v25.1 December 2018

### WBS 2.6 Calibration

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.6 Calibration	2.5.3 Reconstruction				0.4 FTE	<b>0.4 FTE</b>
	2.6.1 Detector Calibration	1.1 FTE	0.6 FTE	0.9 FTE	2.9 FTE	<b>5.4 FTE</b>
	2.6.2 Ice Properties		0.8 FTE	0.9 FTE	0.4 FTE	<b>2.1 FTE</b>
<b>2.6 Calibration Total</b>		<b>1.1 FTE</b>	<b>1.3 FTE</b>	<b>1.8 FTE</b>	<b>3.7 FTE</b>	<b>7.8 FTE</b>

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# FY2019 M&O Responsibilities

MoU v.25.1 January 2019	U.S. Head Count	U.S. FTE	Non-U.S. Head Count	Non-U.S. FTE
Key Personnel	34	9.95	33	9.10
Scientists	29	8.38	17	1.75
Post Docs		5.55		4.05
Grad Students *	40	11.18	62	19.86
Other Professionals **	28	24.65	1	1.00

- Grad Students' Full Time Employment equals to 0.50 FTE
- Other professionals include engineers, data science, software engineers, winterovers, program mngt



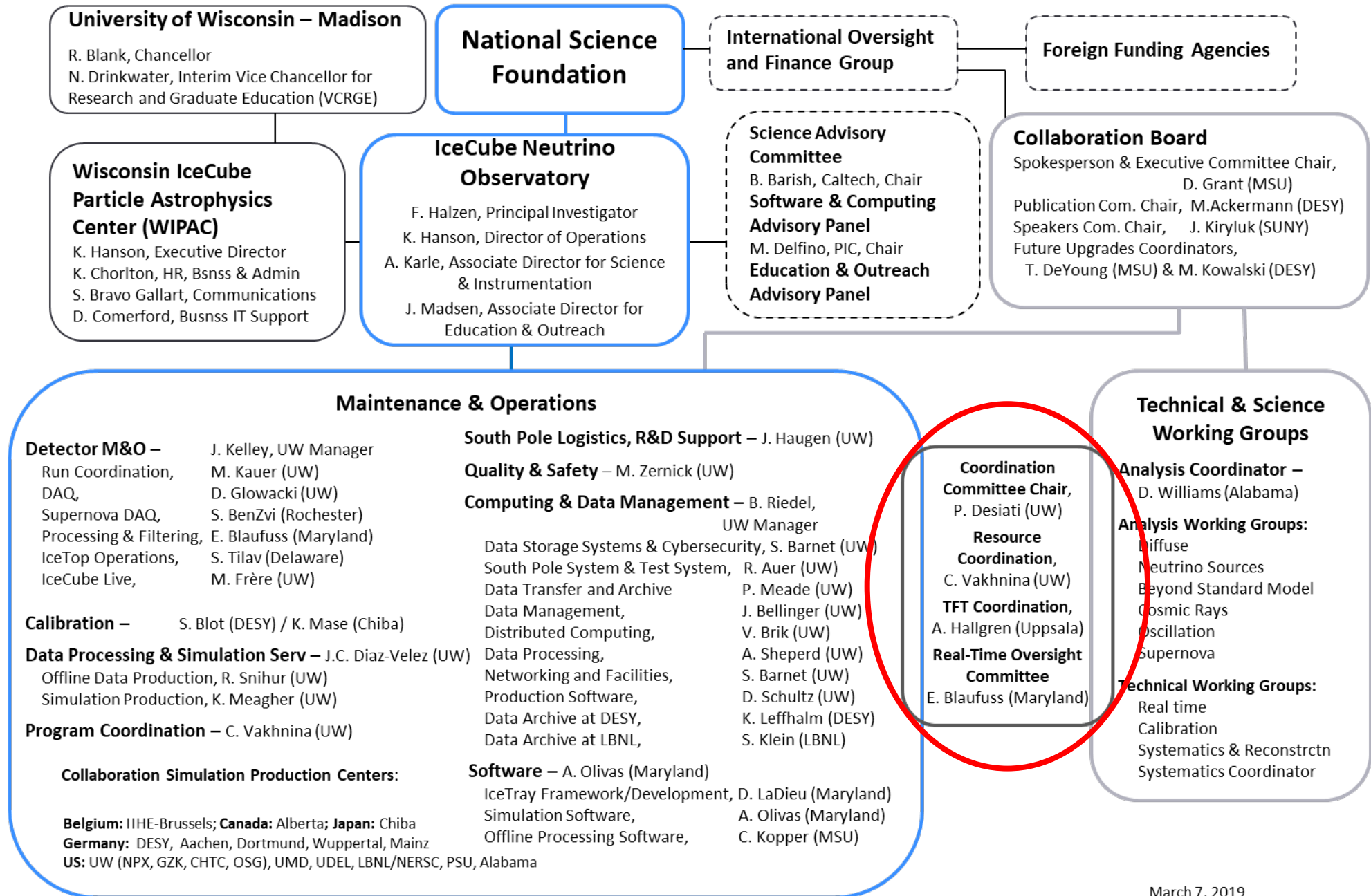
# In-kind Resource Management

- Subaward management described in “M&O Financial ...”
- In-kind
  - 2x per year, MoU SoW updates solicited
  - ICC chair, Software Coordinator, Computing Coordinator work with institutional PIs to match labor with collaboration needs:
    - Basic requirement for detector monitoring shifts
    - Software – simulation / reconstruction algorithms, general analysis tools, strike team
    - Calibration
    - Occasionally detector maintenance
  - And distributed computing resources (B. Riedel talk)
  - Reported at collaboration meetings

	UW	Non-UW
CPU	63%	37%
GPU	57%	43%







# Bridge Between Collaboration and M&O

- ICC manages scientific needs of collaboration:
  - High priority tasks assigned to in-kind labor from MoUs,
  - Software strike team
  - Coordination of passX
  - New re-org of WG technical leads to serve as PoC on ICC
- Coordinates in-kind resource pledges:
  - Labor → high priority tasks or software strike team
  - Distributed computing resources
- Maps needs to resources.



# Composition and Execution

- Membership – evolution of L2 Board in MREFC
  - ICC Chair – P. Desiati
  - M&O Resource Coordinator – C. Vakhnina
  - Each Level 2 coordinator
  - TFT Chair – A. Hallgren
  - ROC Chair – E. Blaufuss
  - Analysis Coordinator – D. Williams
  - Science Working Group Technical Leads
- Monthly teleconference Wed 9.00 am
- Bi-weekly teleconference Tue 10.30 am open for general technical discussion leading up to ICC.





# Summary

- IceCube M&O Program receives significant contributions of in-kind labor from the IceCube Collaboration, heavily in WBS 2.5 Software and 2.6 Calibration
- Also, significant in-kind contributions of Distributed Computing
- The Collaboration updates the Scope of Work and M&O Responsibilities in the MoU's twice a year.
- All resources are coordinated by IceCube Coordination Committee (ICC)