



HydroMeteorological and Environmental Industry Association

WMO-HMEI Collaboration

First Mile Workshop

19 February 2024

Agenda item 3.1, HMEI's Perspective
Joshua Campbell | Chair of HMEI

HMEI – Introduction



HMEI seeks to **build trust** by aligning public, private, and academic capabilities on initiatives and resolutions that will **empower WMO Members** to carry out their duty to **protect** and **enhance** the lives and livelihoods of their citizens.

❖ HMEI Vision:

- ❖ **Empowering** the weather, water and environmental community, **strengthening** partnerships across public, private and academic sectors, **protecting** lives and **enabling prosperity** for all.

❖ HMEI Mission:

- ❖ We execute our Vision by facilitating open communication and **close collaboration**, helping **implement standards**, and **fostering innovation** that **promotes sustainability**.

HMEI – Commitment



HMEI seeks to build trust as:

- ❖ We **Affirm and support** the central role of NMHSs as the authoritative voice for public health and safety
- ❖ We **Share** our technical expertise with, and learn from the WMO, WMO Members, and other international organizations to ensure policies are informed and implemented with the **best science, innovation, and practices**
- ❖ We **Engage** with the WMO to **align** public, private, and academic initiatives that will empower WMO Members to achieve their objectives

How WMO & HMEI Began This Exploration



Over the past year, the WMO has continued to introduced a new data telecommunication system to share data between NMHSs (WIS2.0). During the implementation, it became apparent that NMHSs struggled to amalgamate and share the data from their observing systems. Through a collaborative dialogue, this workshop was planned to begin to address the issue in earnest.

Items this presentation will cover today:

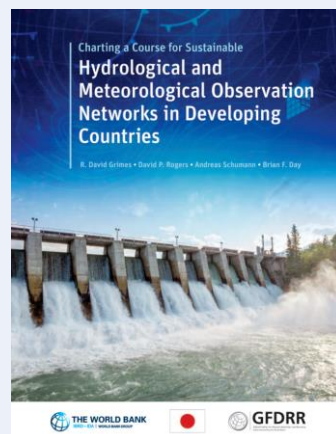
- ❖ Acknowledge this is one of perhaps several “First-Mile” issues.
- ❖ What are we to focus on, and why?
- ❖ A short example (SDI-12).
- ❖ A proposed framework to establish such a protocol.



Potential First-Mile Issues

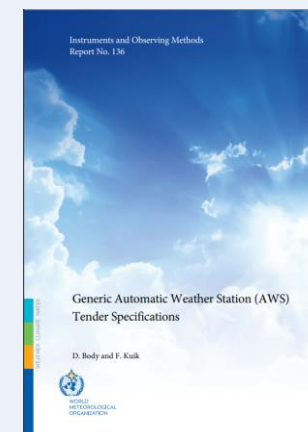
- ❖ Conflicting or Redundant International Funding Institution requirements
- ❖ Ongoing funds to maintain systems
- ❖ IT Capabilities to handle server upgrades
- ❖ Competitive pay to attract & retain skills/capacity
- ❖ Operational Budgets to support connectivity
- ❖ Conflicting sampling intervals
- ❖ Conflicting data reduction standards
- ❖ Conflicting report intervals between NMHSs
- ❖ Different QC/QA algorithms and processes
- ❖ Multiple systems with different output that needs to be shared on one International Data Exchange System (IDES)

Publications that can help drive consistency and sustainability



Charting a Course for Sustainable Hydrological and Meteorological Observation Networks in Developing Countries

[Link to doc](#)



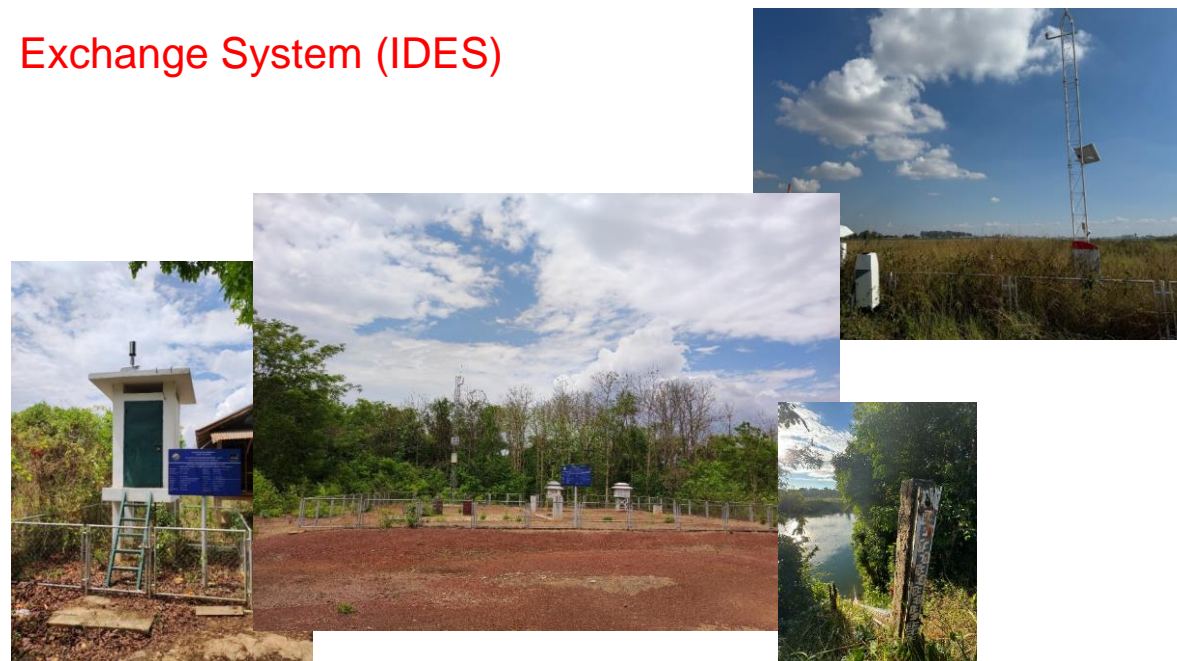
Generic Automatic Weather Station (AWS) Tender Specifications

[IOM-136](#)

The First-Mile Issue of **Focus**

- ❖ Conflicting or Redundant International Funding Institution requirements
- ❖ Ongoing funds to maintain systems
- ❖ IT Capabilities to handle server upgrades
- ❖ Competitive pay to attract & retain skills/capacity
- ❖ Operational Budgets to support connectivity
- ❖ Conflicting sampling intervals
- ❖ Conflicting data reduction standards
- ❖ Conflicting report intervals between NMHSs
- ❖ Different QC/QA algorithms and processes
- ❖ **Multiple systems with different output that needs to be shared on one International Data Exchange System (IDES)**

Project	Implementation Dates	Meteo-Quantity	Hydro-Quantity
ADB Flood Risk Mitigation Support	2013-2017	9	18
WB-MIWRM Support	2015-2021	18	78
WB-DRM Support	2021-2024	48	22
JICA Support	2017	18	9
FAO SAMIS Support	2020	15	0
China Support		0	25
Korean Support	2016 -2020	1	32
HYCOS		1	23
UNDP		3	
Total		113	207



The First-Mile Issue of Focus

320 Sites 11 Networks

- ❖ Multiple systems with different output that needs to be shared on one International Data Exchange System (IDES)

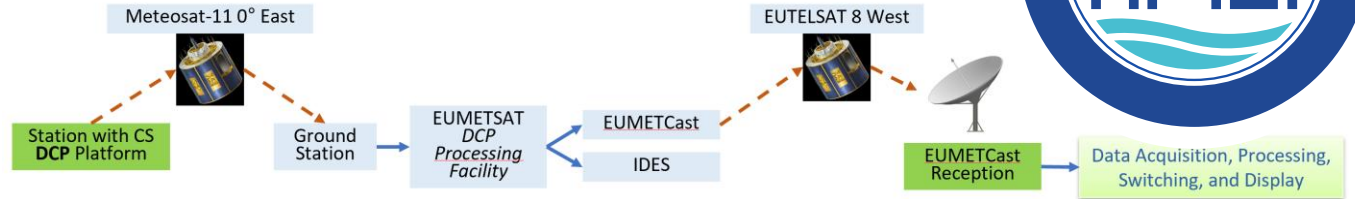


Nr.	Interface Name or IFI	Type	Interface Description				Data Format (Binary, File?)	Channel Type (Socket, FTP, etc)	Frequency (e.g. every 4hr, daily, etc)
1	ADB	Hydro	Station2_10min_20200915020418.dat				.csv	Modbus	every 10 min
			Project	Implementation Dates	Meteo-Quantity	Hydro-Quantity	.txt	SFTP	every 1 hour
			ADB Flood Risk Mitigation Support	2013-2017	9	18	_0402.csv	FTP	every 10 min
			WB-MIWRM Support	2015-2021	18	78	ASCII	Socket TCP/IP	every 10 min
			WB-DRM Support	2021-2024	48	22	*.bufr	FTP	every 1 hour
			JICA Support	2017	18	9	10-	FTP	every 1 hour
			FAO SAMIS Support	2020	15	0	URL API	XML	API
			China Support		0	25	SQL Queries	SQL Queries	
			Korean Support	2016 -2020	1	32	SQL Queries	SQL Queries	
			HYCOS		1	23	.csv	FTP	every 15 min
			UNDP		3				
			Total		113	207			
9	UNDP								

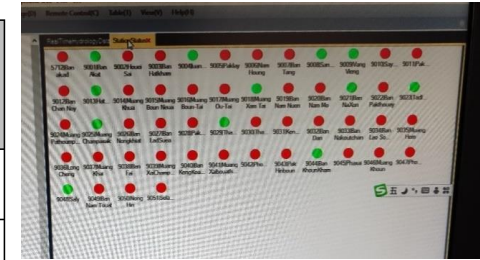


The First-Mile Issue of Focus

320 Sites 11 Networks



Nr.	Interface Name or IFI	Type	Interface Description	Data Format (Binary, File?)	Channel Type (Socket, FTP, etc)	Frequency (e.g. every 4hr, daily, etc)
1		Hydro	Station2_10min_20200915020418.dat	.csv	Modbus	every 10 min
1.1		Meteo	08.txt	.txt	SFTP	every 1 hour
2	IIWRM	Meteo/Hydro	1100_AP_20230119_0402.csv	.c		
3	RM	Meteo/Hydro		.AS		
4		Meteo	*.bufr	*.k		
4		Hydro	BANKE_DATA_EXPORT_2020-0504_1000.csv	.c		
5		Agro	tion provided by the URL API	XI		
6			ccess to DataBase	SQL C		
7	n	Hydro				
8	S	Hydro				
9						



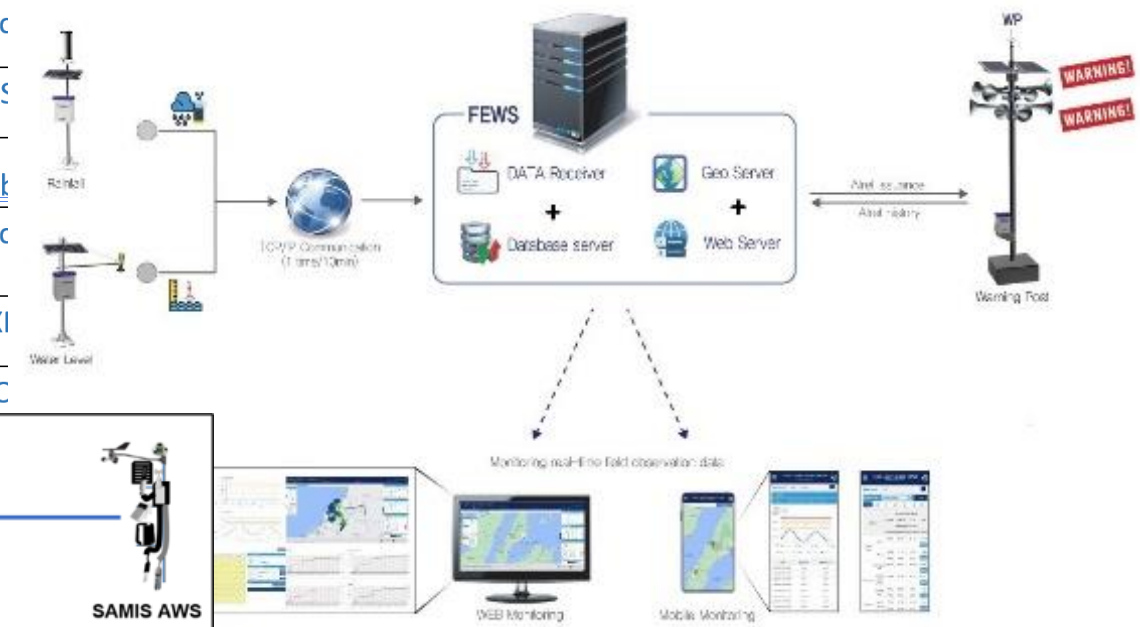
320 Sites
11 Networks

Data Collection System

Data Collection System

Data Collection System

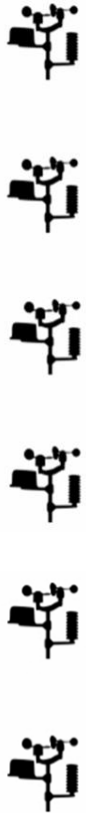
Data Collection System



The First-Mile Issue of Focus



320 Sites



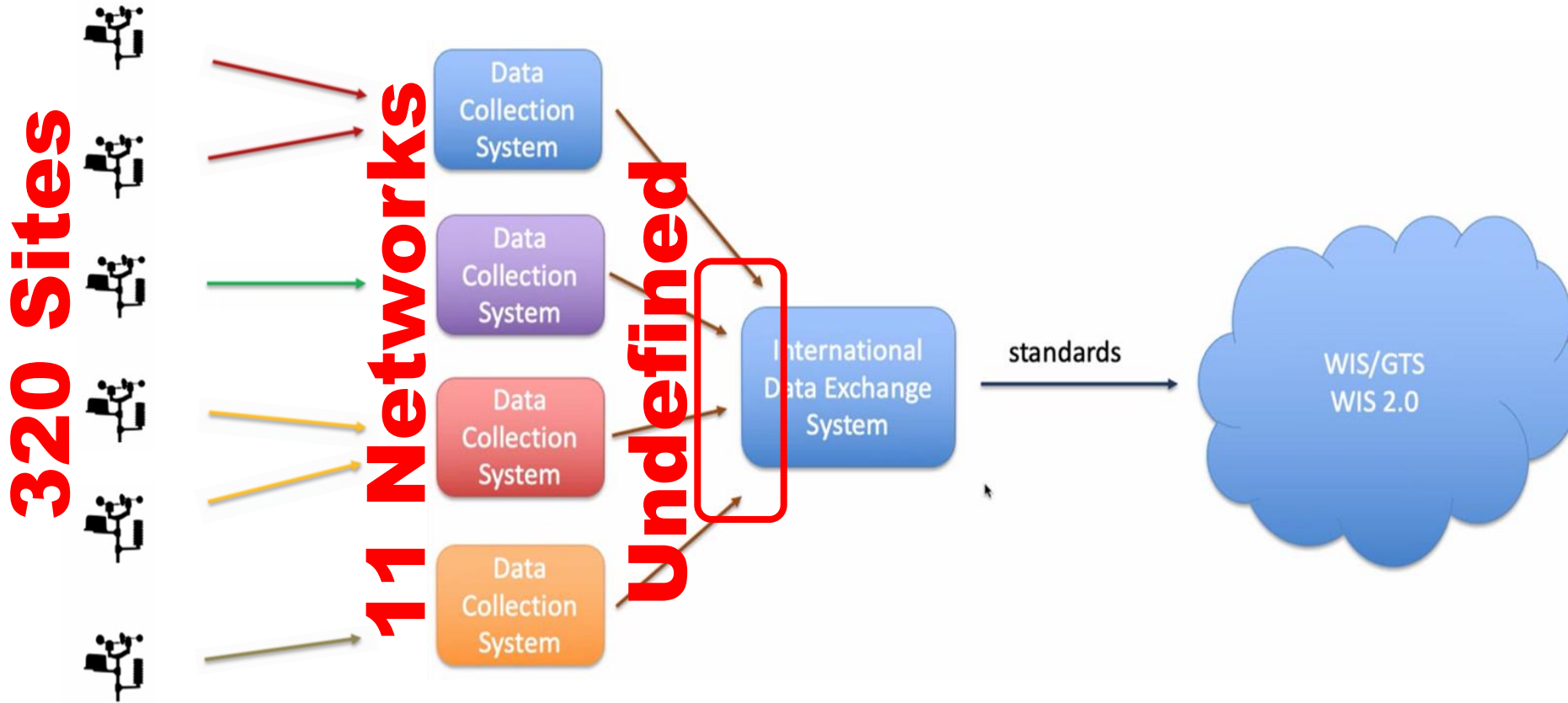
11 Networks



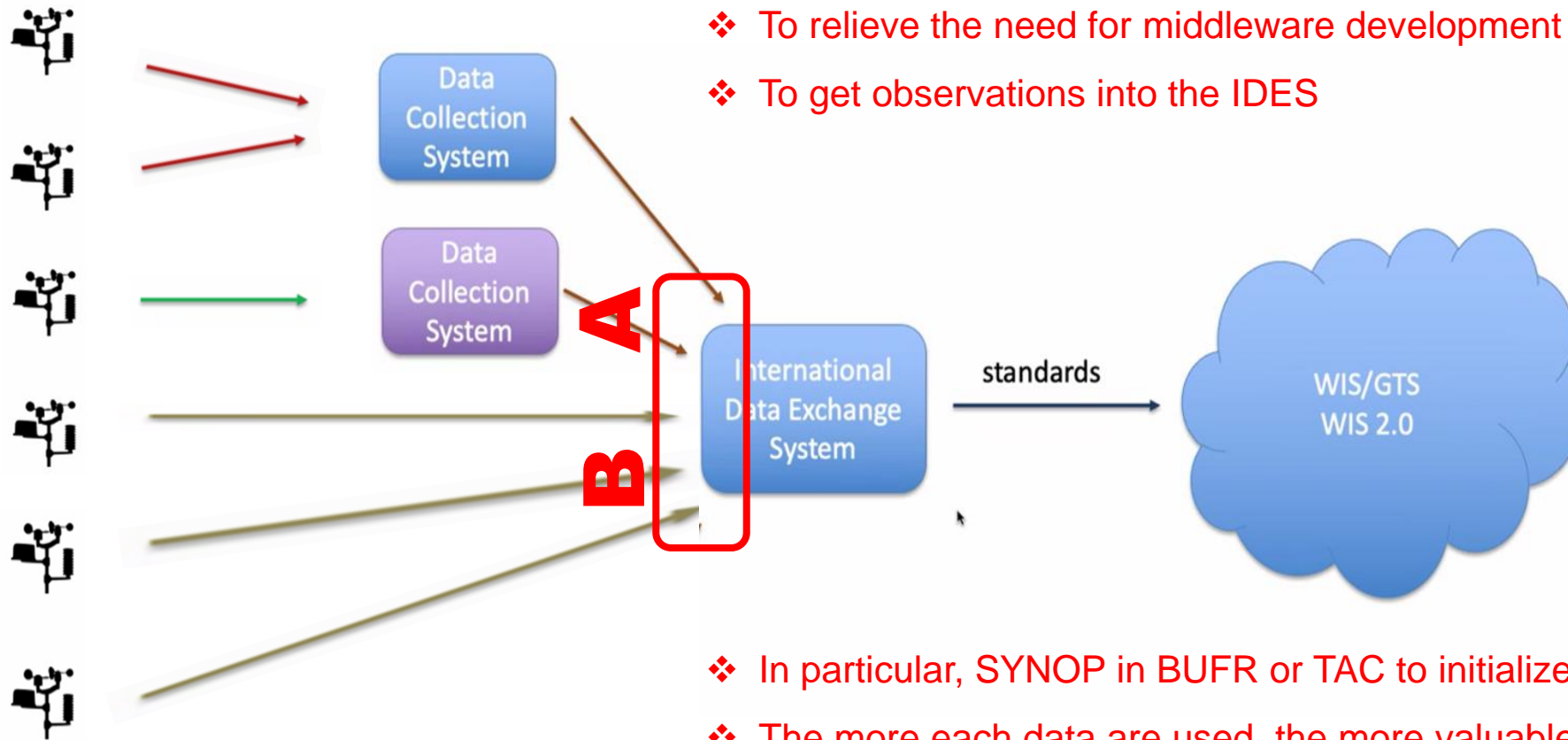
Each network possess different characteristics:

- Frequency of observations (every 3 seconds, every 1 minute, every 10 minutes)
- Frequency of data transmission (every 1 minute, every 10 minutes)
- Communication protocols & layers (MODBUS, RS485, SSRF, UHF/VHF, Satellite, TCP/IP, etc.)
- Transmission protocols (FTP, API, Socket)
- Alarm thresholds configurations
- Data formats (CSV, TXT, BUFR)

The First-Mile Issue of Focus



First-Mile | Why?



- ❖ In particular, SYNOP in BUFR or TAC to initialize NWP models
- ❖ The more each data are used, the more valuable they become!

First-Mile | Developing A Standard



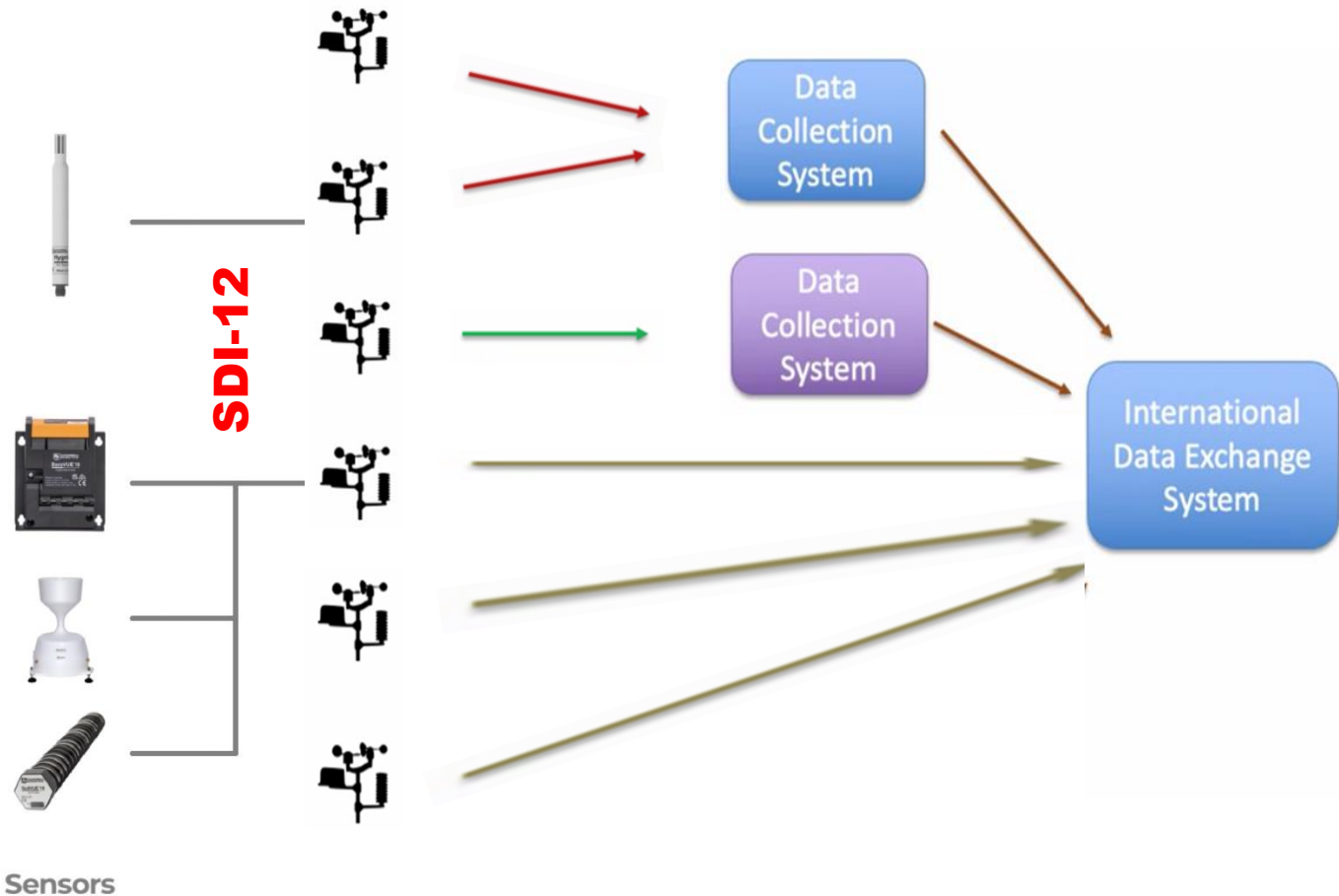
HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)



- ❖ Define the problem we are trying to solve
- ❖ Be prepared to accept limitations

- ❖ What not to do...
- ❖ ISO11783 (CAN ISOBUS)

First-Mile | Developing A Standard | SDI-12 | First-Meter



- ❖ A **Public** (USGS/HIFF) - **Private** (8 companies) **engagement** formed the SDI-12 standards group.
- ❖ SDI-12's **purpose** was to create and curate an open standard for digital environmental sensors.
- ❖ **SDI-12** products now **span the globe**.

First-Mile | Developing A Standard | What It Takes



- ❖ Define a **Purpose**
 - ❖ Know why we are creating a standard and what it needs to do.
- ❖ Accept the **Limitations**
 - ❖ A standard that does everything is not a standard.
- ❖ Ensure we form the **Creation** and fund **Curation**
 - ❖ Standards are only as alive as the body that regulates them.

First-Mile | Additional Community Perspectives



- ❖ **Jorma Islander will share:**

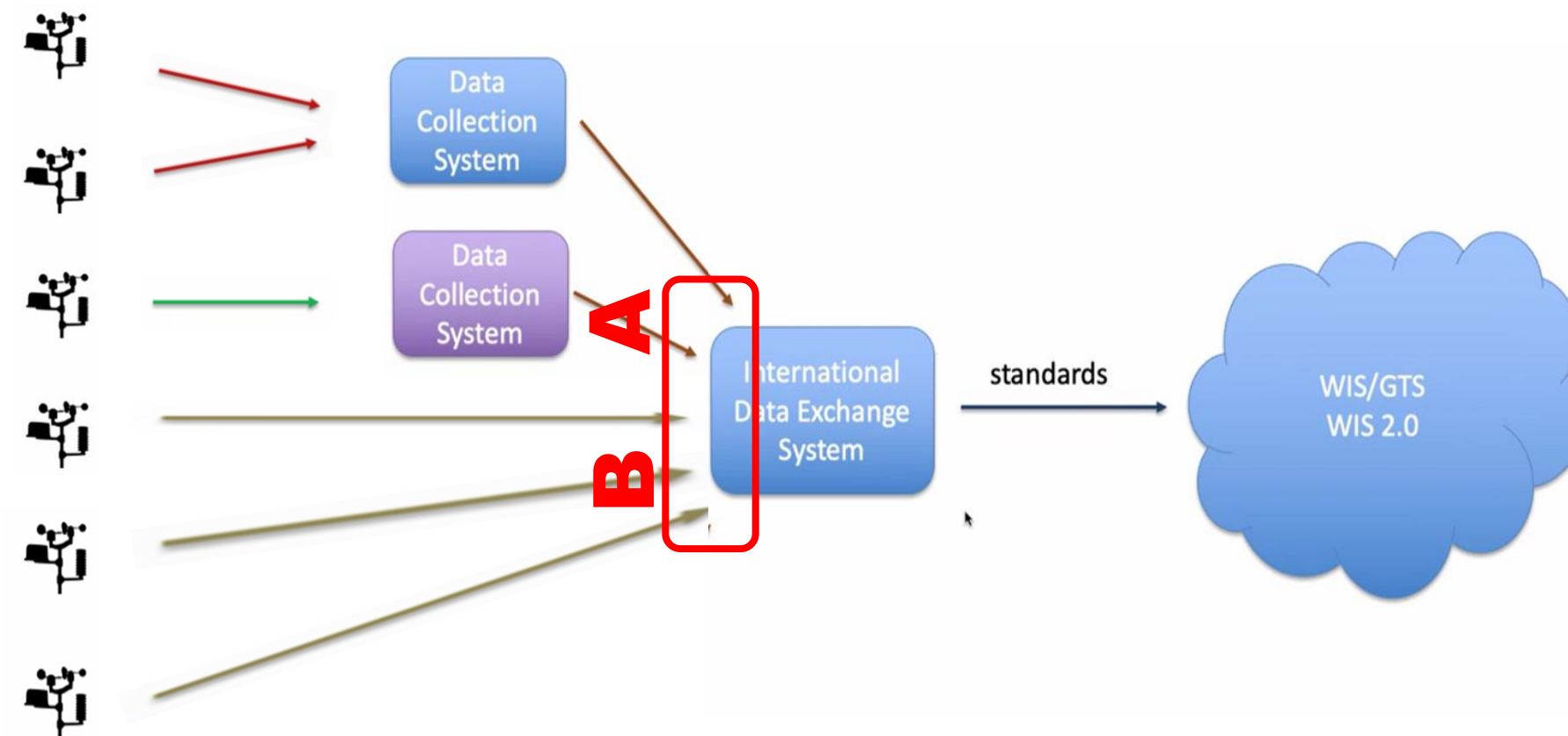
- ❖ The **evolution** of Automated Weather Station protocols,
- ❖ **Protocols** and **standards** that are in use today,
- ❖ and what we understand the desired **focus** to be.

- ❖ **Ilse Gayl will share:**

- ❖ **Network types**, their **uses** and **priorities**,
- ❖ **Multi-use platforms** and additional considerations.

First-Mile | Summary Thought

- ❖ Let's come back to the **focus** of this effort, which could be:
- ❖ **Establish a standard for stations and networks to share data on the IDES.**





Thank You

HMEI Council

Joshua Campbell

Chair

e: joshua@campbellsci.com

t: +1 435-227-9739

Ms. Jay Wilson

Councilor for WMO Collaboration

e: josephine.wilson@otthydromet.com

m: +41 79 617 9919

HMEI Secretariat

Dr. Alexander Karpov

Executive Secretary

e: akarpov@hmei.org

t: +41 22 730 8334

Ms. Corine Perreman

Administrator

e: cperreman@hmei.org