



Convened by



# **Overview of RIEDP Reuse and Interoperation of Environmental Data & Processes**

3D Geospatial Modeling & Simulation Summit  
100<sup>th</sup> OGC Technical Committee  
Orlando, FL USA

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Chair - RIEDP Product Development Group

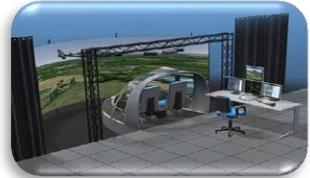
19 September 2016

# Sogitec at a glance



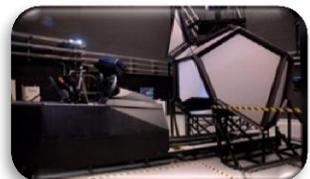
- **Flight Training Simulators**

- Mirage Family (F1, -5, D, -9, H, ...)
- Rafale omnirole Fighter A/C
- Helico (NH90, Dauphin, Cougar)



- **Users**

- France
  - FAF, Army Light Aviation, Navy
- Foreign countries
  - NATO
  - Middle East (Egypt, Qatar, UAE, ...)
  - India
  - Taiwan
  - ...



# Environment Requirements for a Flight Simulator

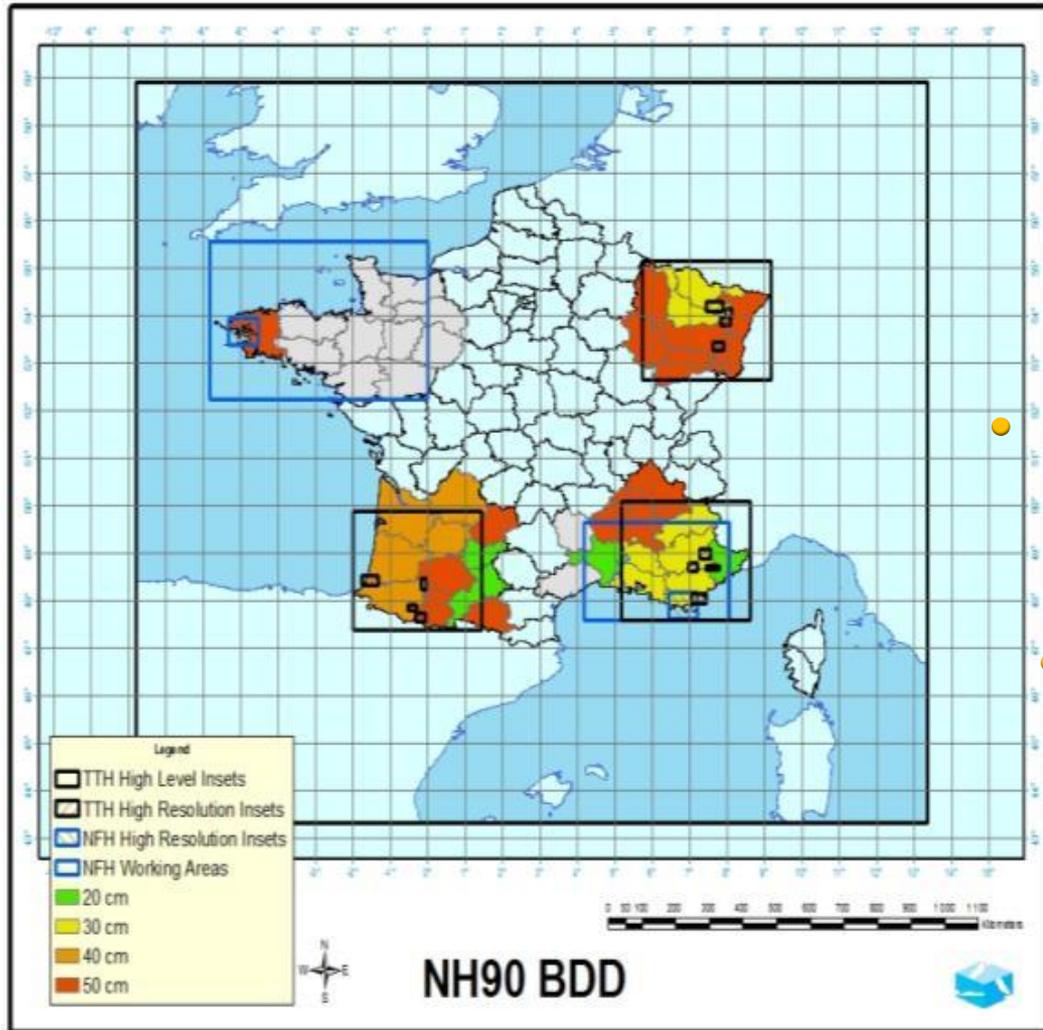


# *Always more Fidelity in the Environment*

Elevation Grid: 25 m  
Elevation Grid: 1 m

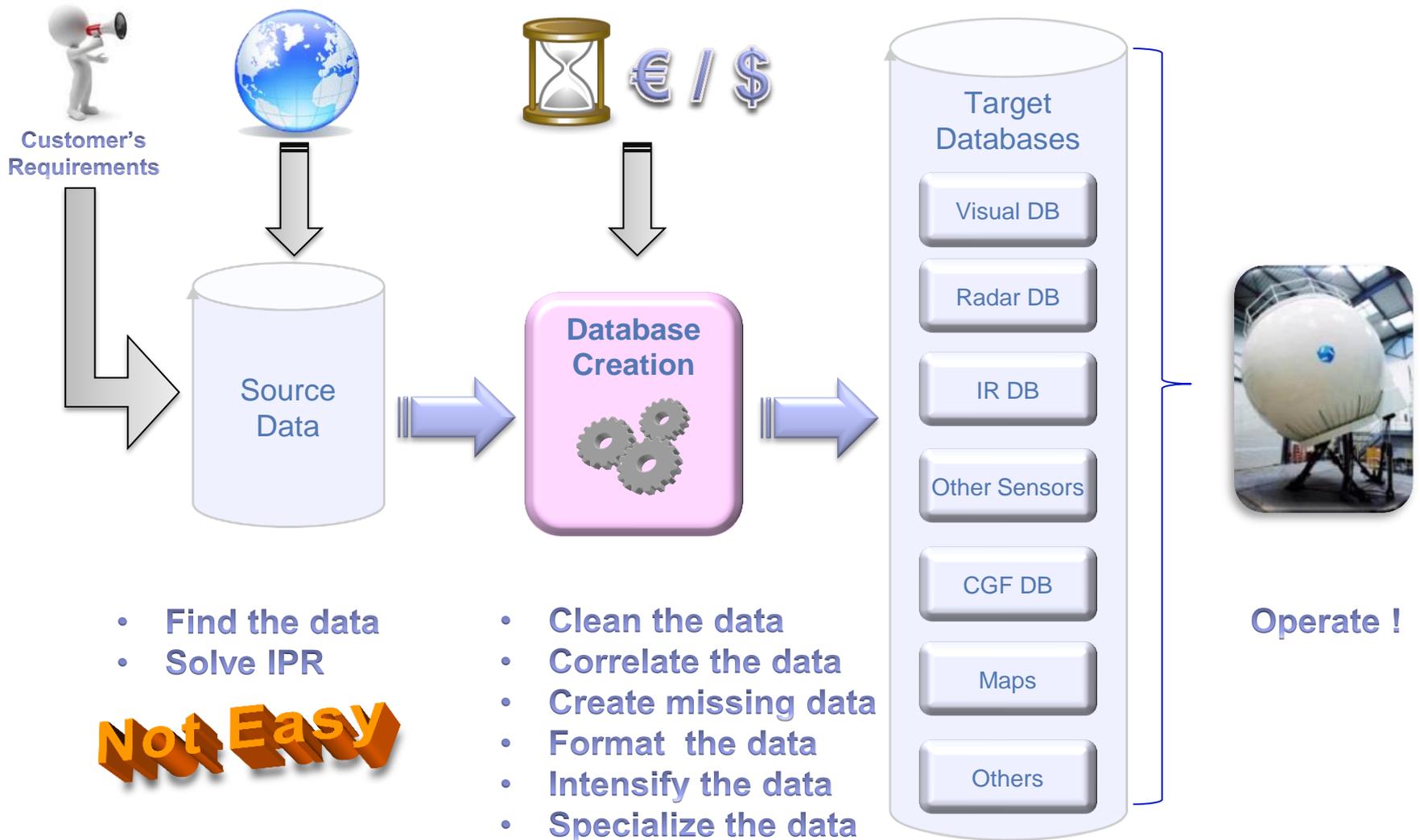
**1- More fidelity is required**  
**2- Not just Imagery**

# Typical Terrain Requirements (e.g. France NH90 FFS)

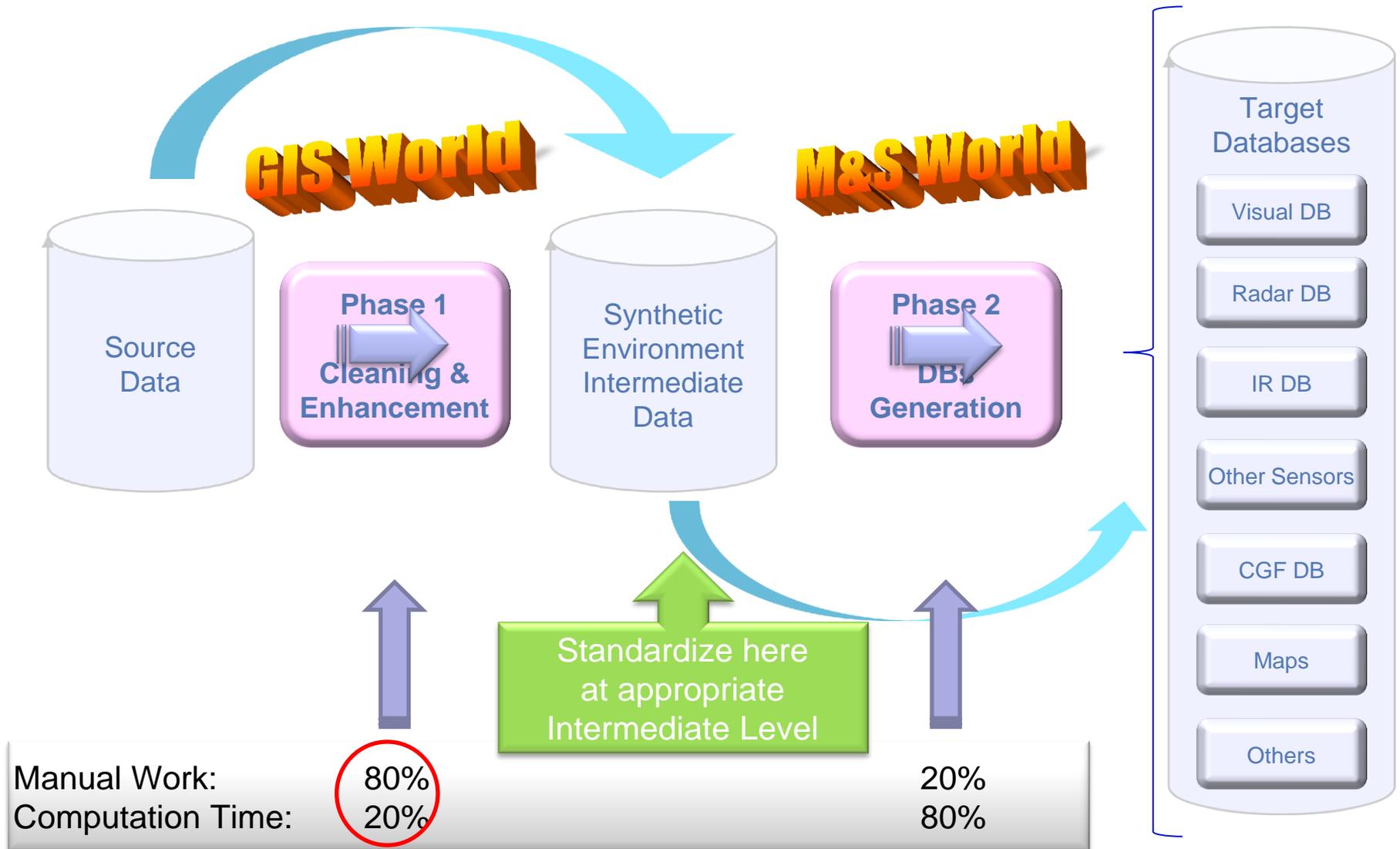


- Large Areas
- 1/2 Million km2 and more
- Higher Fidelity
- For Training & Mission Rehearsal

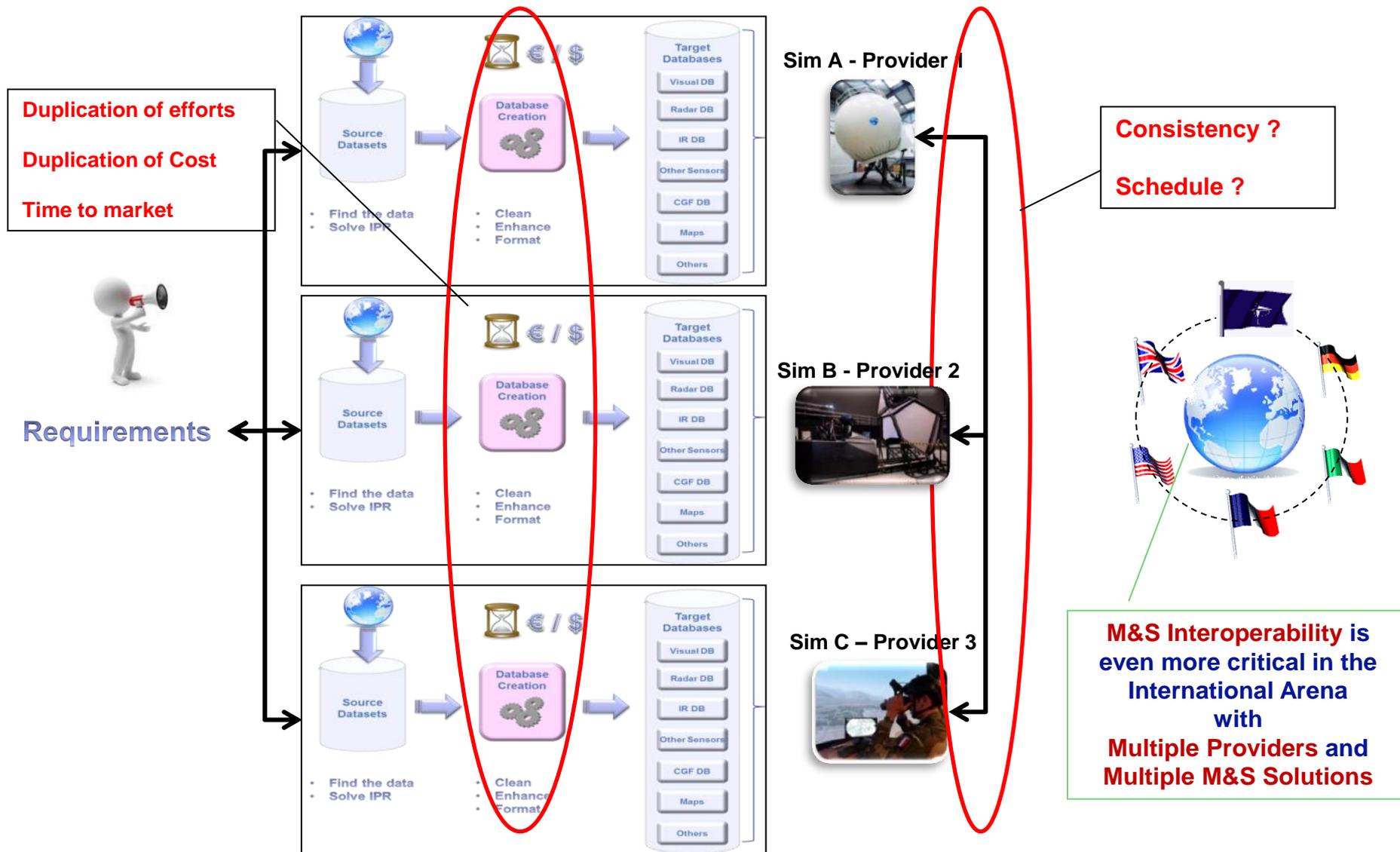
# Building a Simulator Database



# Data Transformation Process – Two main phases



# Main issues for Distributed Simulation Reuse – Correlation – Interoperability ....



# *M&S Interoperability*

- **What it is Not**

- The same Product and associated Solutions for everyone
  - Does not work, certainly not in the **Joint and International** arenas
  - Puts **innovation** at risk
  - What product to choose? No single solution is sufficient

- **What it is**

- Consistency in Modelling, associated Data and **Semantics** at Component Level
- Allowing **Components** to work together at **System & System-of-Systems** Levels
- Fostering **Multiple-Provider Solutions**
  - e.g. : I/ITSEC/OBW Federations

**Interoperability relies on **Appropriate Standards****

# *Appropriate Standards*

- **What for?**

- Avoiding “reinvention of the wheel” and ...
- Establishing and Promoting Fair Competition
  
- Allowing other Innovations on top of the standardized Solutions

- **Conditions**

- Truly Open Standard Development and Maintenance Process

- **For LVC M&S Community, this is the role of SISO**

LVC: Live Virtual Constructive

# Data Transformation Process – Improvement through RIEDP

- **The Creation process may be made more efficient**

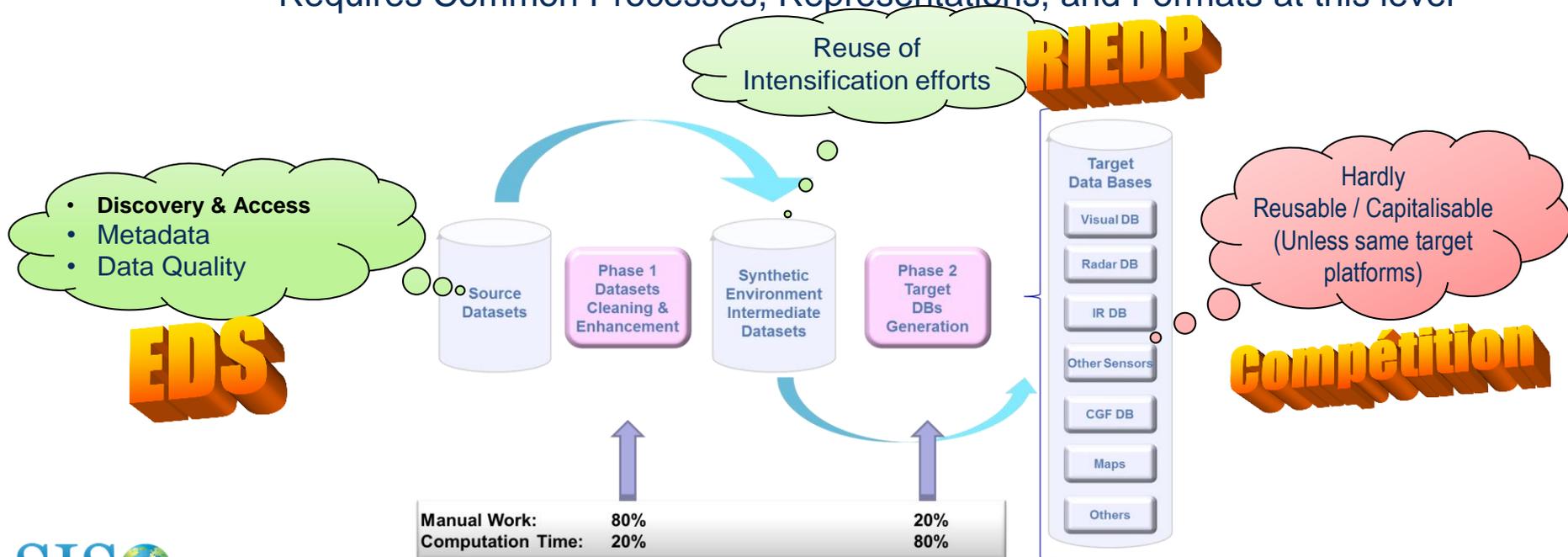
- If Source data is consistent

- Within each and between the layers (depends on Data providers)

- If previous creation efforts may be reused

- At Source Data Level (Linked to GIS World)
- At Intermediate Level

- Requires Common Processes, Representations, and Formats at this level



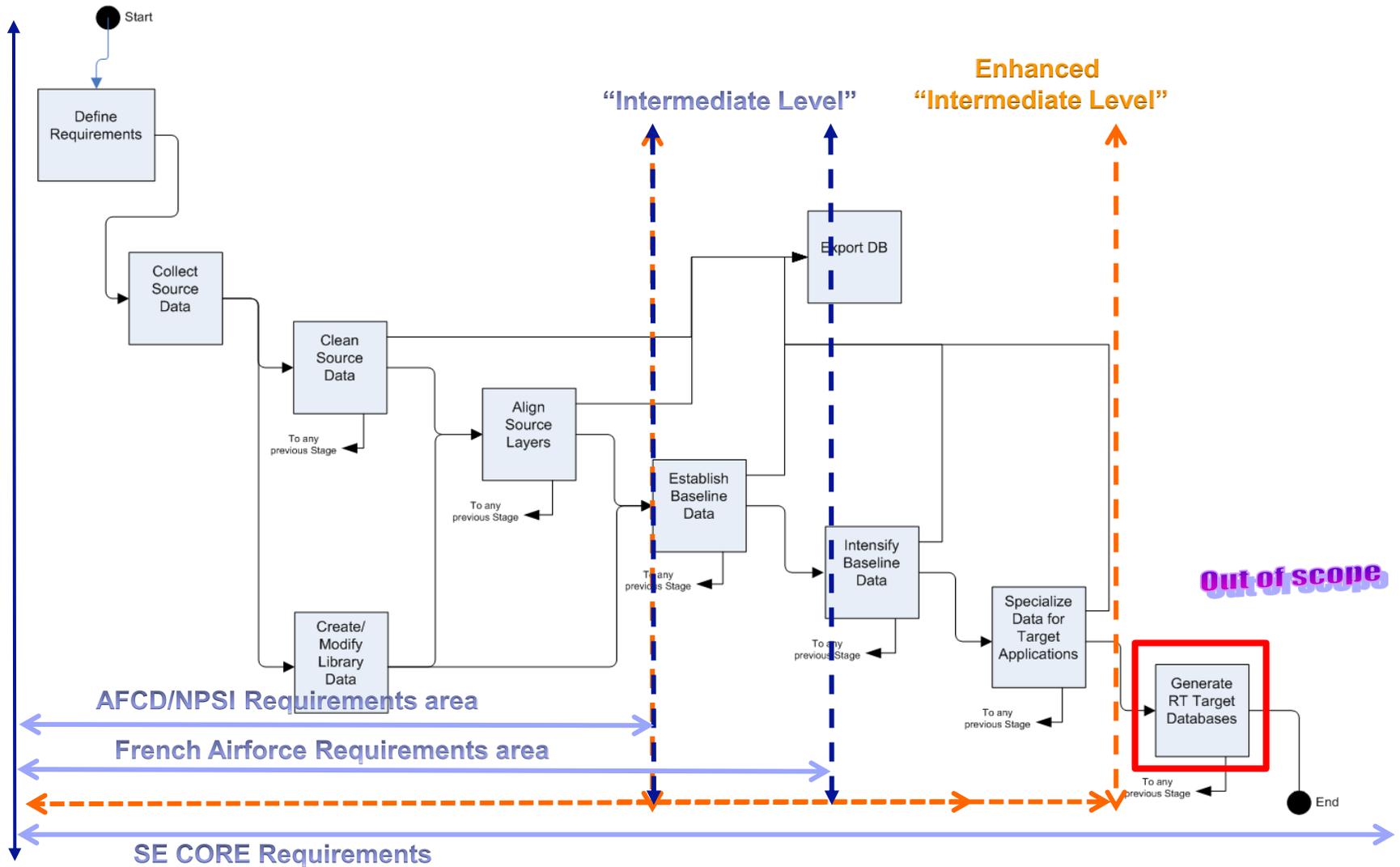
# Scope of the SISO RIEDP Product Development Group

- **Standardization efforts needed in following areas:**
  - A Reference Process Model
  - An expressed Data Model for the specific applications
  - Formats with specified use/parameters
  - Standardized Attribution and Metadata
- **Divided along two axes leading to two products:**
  - **RIEDP Data Model Foundations** with two coupled parts:
    - The Reference Process Model (RPM) - High Level representation of the database creation process model
    - Reference Abstract Data Model (RADM) - High level Database concepts: Including principles of Tiles, Layers, Library, Spatial Reference, Relationships, ...
  - **RIEDP Detailed Features description:**
    - **Objects:** Identification of geo-specific object instances and templates (features, 3D objects, textures) within the Library, and the linkage between instances and templates;
    - **Dictionary:** choice of semantics and mapping with existing dictionaries;
    - **Attribution:** Identification of a common list of features, attributes, attribution rules, range values ...

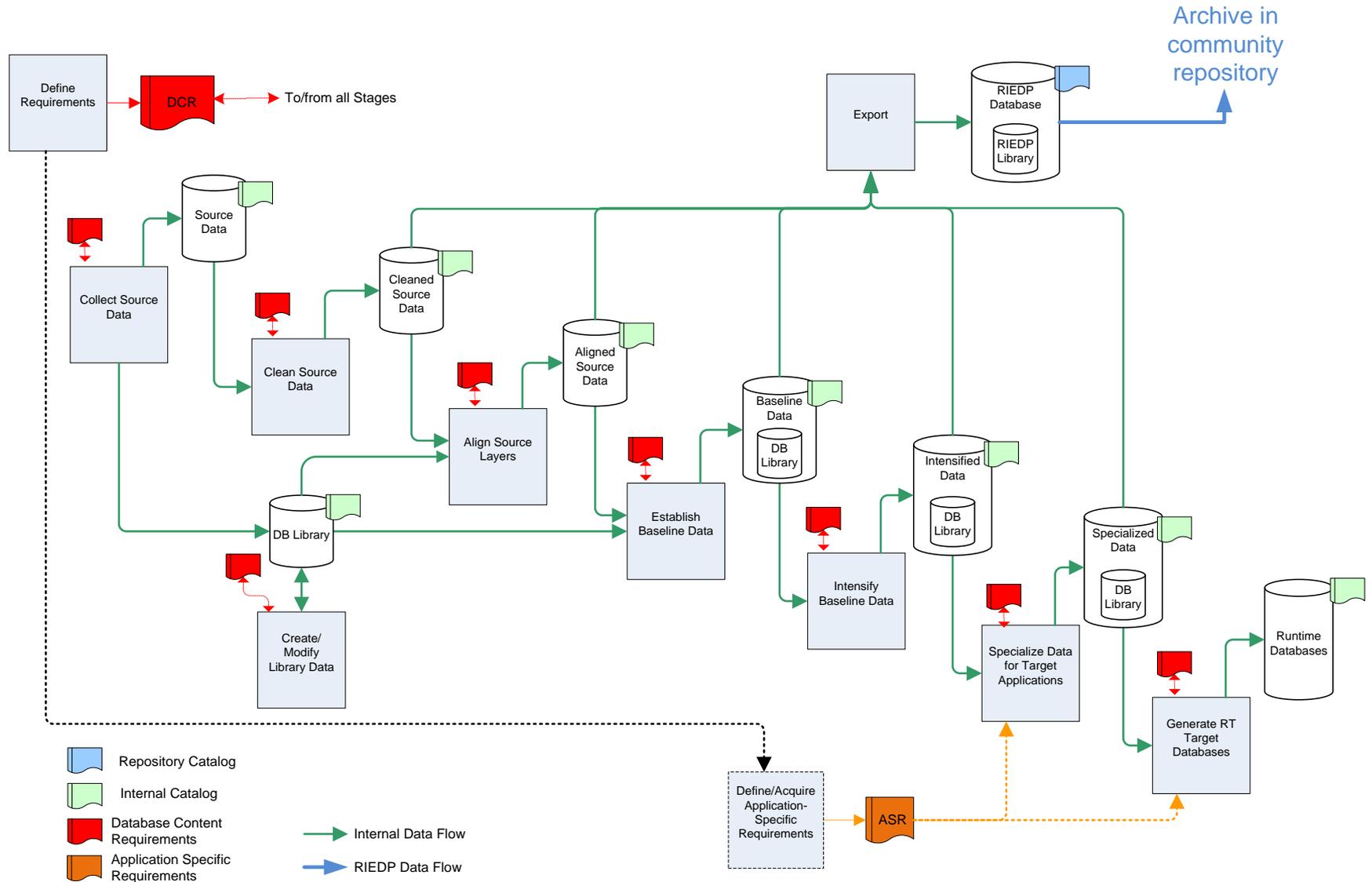
**Semantics**



# Sharing data with the highest possible added value



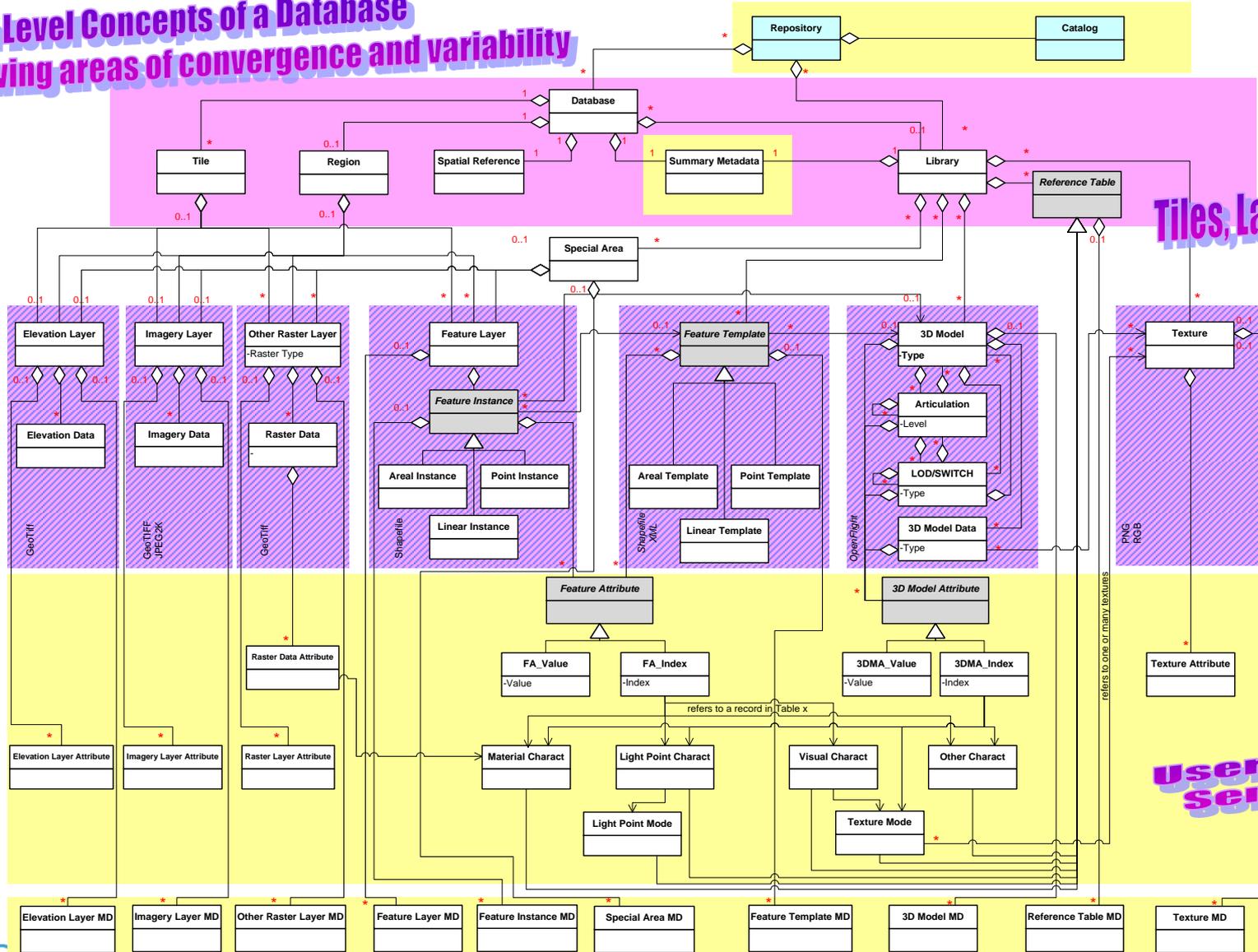
# RIEDP Reference Process Model Data Flow



# RIEDP Reference Abstract Data Model

- Variability
- Common format
- Convergence

**High Level Concepts of a Database**  
**Showing areas of convergence and variability**



**Tiles, Layers Library,**

**COTS**

**User Defined Semantics**

# RIEDP Profiles

- RIEDP supports data sharing from specific RPM stages
- RIEDP-compliant Data Products shall conform to one of the RIEDP Profiles
- A Profile specifies:
  - A stage in the RPM
  - Mandatory and Optional Data in accordance with the RADM

RPM Stages \ RADM Classes	Collect Source	Cleaned	Library Creation	Aligned	Baseline	Intensified	Specialized	Runtime
Summary Metadata		M		M	M	M	M	
Spatial Reference		M		M	M	M	M	
Tile or Region								
Elevation		M		M	M	M	M	
Imagery		M		M	M	M	M	
Other Raster		O		O	O	O	O	
Feature instance		O		O	M	M	M	
Library								
Summary Metadata		-	M	M	M	M	M	
3D Model		-	M	O	M	M	M	
Texture		-	M	O	M	M	M	
Special Area		-	O	O	O	O	O	
Feature Template		-	O	O	O	M	M	
Reference Table		-	O	O	O	M	M	
<b>Profiles</b>	N/A	Basic-Cleaned	Library-Only	Basic-Aligned	Basic-Baseline	Full-Intensified	Full-Specialized	N/A

# RIEDP vs other Inter.al M&S Standardization Efforts

Nature	Standards		Projects						Other
Name	SIF	SEDRIS	NPSI	AFCD	CDB	SE Core	Missionland	Other	EDS
Origin	US DOD	US DOD	US Navy	USAF	USSOCOM	US Army	NATO	e.g. French Air Force	US DoD
Introduction Date	1991	1994	2004	2006	2004	2008	2010	2006	201x
Standard	Yes	Yes ISO	User Standard	User Standard	User & Commercial Standard	User Standard	User Standard	User Standard	Reuse of Standards
Open Standard	Yes	Yes	limited	limited	Open Specification	limited	limited	limited	-
Approach	Format according to standard	Standardized Semantics and Data Model + Format according to standard	<p>Based on de-facto Standard Formats (GIS Source) but No Consistent Semantics or Standards. Similar but not the same. Generalized.</p> <p><b>RIEDP addresses these Topics</b></p>						Data Discovery & Access
Availability of Commercial Support Tools	Obsolete	Tools developed in SEDRIS COI	Commercial Tools for de-facto and Standard Formats						Portal

AFCD: Air Force Common database  
 COI: Community of Interest  
 EDS: Enterprise Data Services  
 NPSI: NAVAIR Portable Source Initiative  
 SIF: SSDB (Standard Simulator Database) Interchange Format  
 SE Core: Synthetic Environment Core

# *Appropriate standards – Environmental Data: RIEDP*

- **Use resources from existing Standards (SISO, ISO, NATO)**
  - Specification of Entity Identification (SISO SWG Enumerations)
  - Specification of Position and Orientation Data (ISO/IEC SEDRIS/SRM)
  - Identification of Objects / Features and their Attributes (ISO/IEC SEDRIS/EDCS)
  - Definition of a Representation Model of the Environment (ISO/IEC SEDRIS/DRM)
  - Specification of Metadata (ISO 19115, DCMI, DDMS, FGDC, EDS)
  - Alliance M&S Standards Profile (NATO MSG)
- **Complement this Foundation for M&S applications (RIEDP Focus)**
  - Make use of “de-facto” standards from the Military and GIS communities
  - Develop additional elements to address M&S-specific needs
- **RIEDP Initial Focus :**
  - Aircrew Training & Mission Rehearsal, extensible to the broader M&S COI

COI: Community of Interest  
DCMI: Dublin Core Metadata Initiative  
DDMS: DoD Discovery Metadata Specification  
EDS: Enterprise Data Services  
FGDC: Federal Geographic Data Committee  
SWG: Special Working Group

# RIEDP PDG – Get Involved

- **Please Join SISO by becoming a SISO Member**

- by attending the SIW Meetings
- by registering on the Web Site (\$ 90)

- **Then share with the community**

- PDG SISO Discussion - **Register** for Discussion:

- Logon to SISO Discussions and select
  - SAC-PDG-RIEDP (Don't forget to select SUBMIT !)

- PDG SISO Webpage - **Complete Affiliation Form:**

- Standards Activities > Development Groups >
  - Reuse and Interoperation of Environmental Data and Processes (RIEDP) PDG

- PDG SISO Library File Folder – Access PDG Documents:

- SISO Digital Library > Development Groups > RIEDP PDG



## *Conclusion*

- **Thank you for your attention !**
- **Any questions ?**



- **Full version of the Brief available on the Wiki**

**Please Join !**