

Collection and Analysis of Land Imaging Requirements

Landsat Science Team Meeting - March 3, 2011

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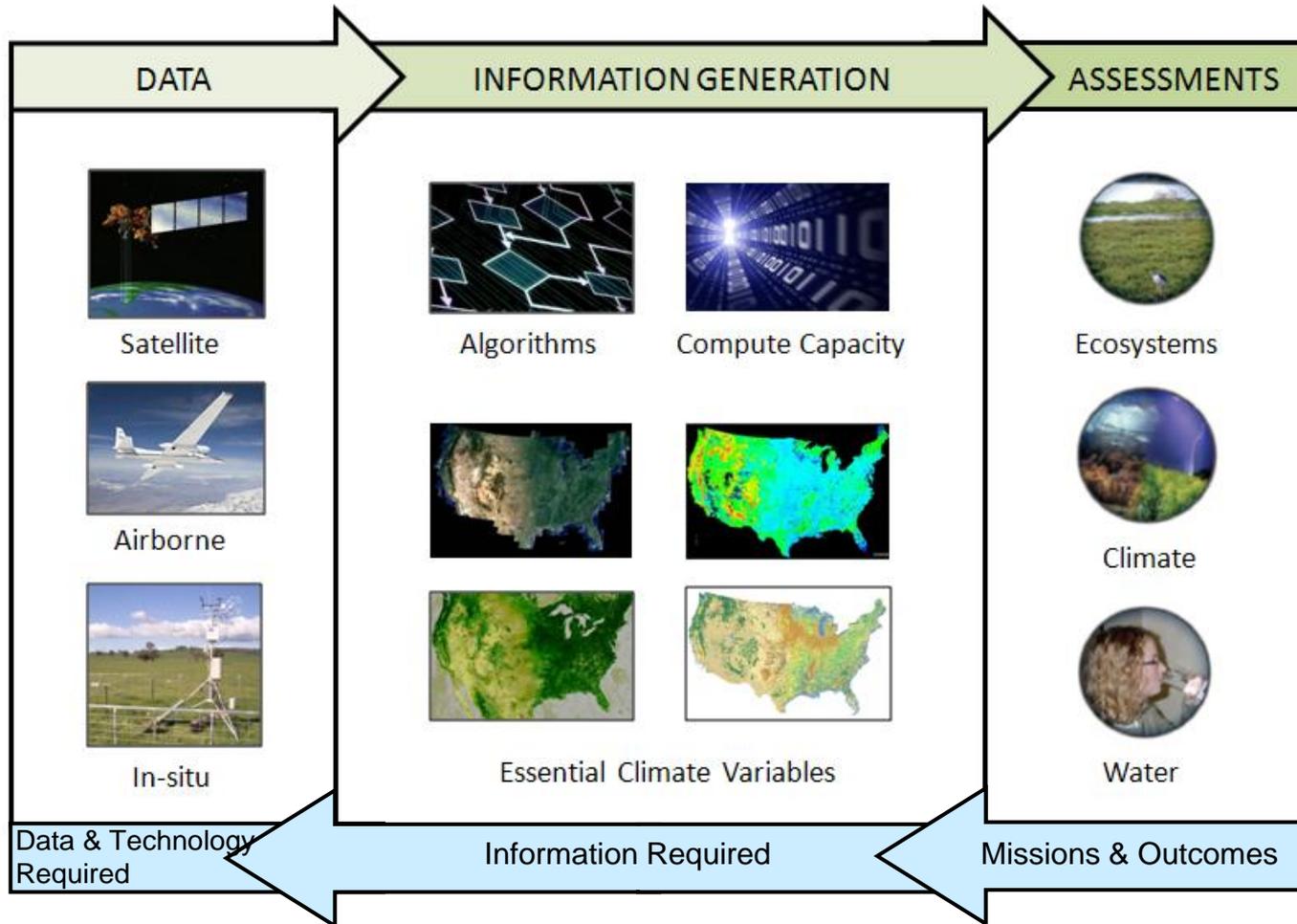
Understanding User Requirements

“...gathering and prioritizing Federal user community requirements for land image data...”

- What are the science questions and resource management problems being addressed?
- What types of information are needed?
- From what data can the information be derived?
- What are the existing or desired measurements to be used?
- What instruments and platforms exist or need to be developed for collecting these measurements?
- What are the desired product characteristics and specifications?
- What levels of service are needed?



Agency Missions & Expected Outcomes Drive Requirements



Generalized approach

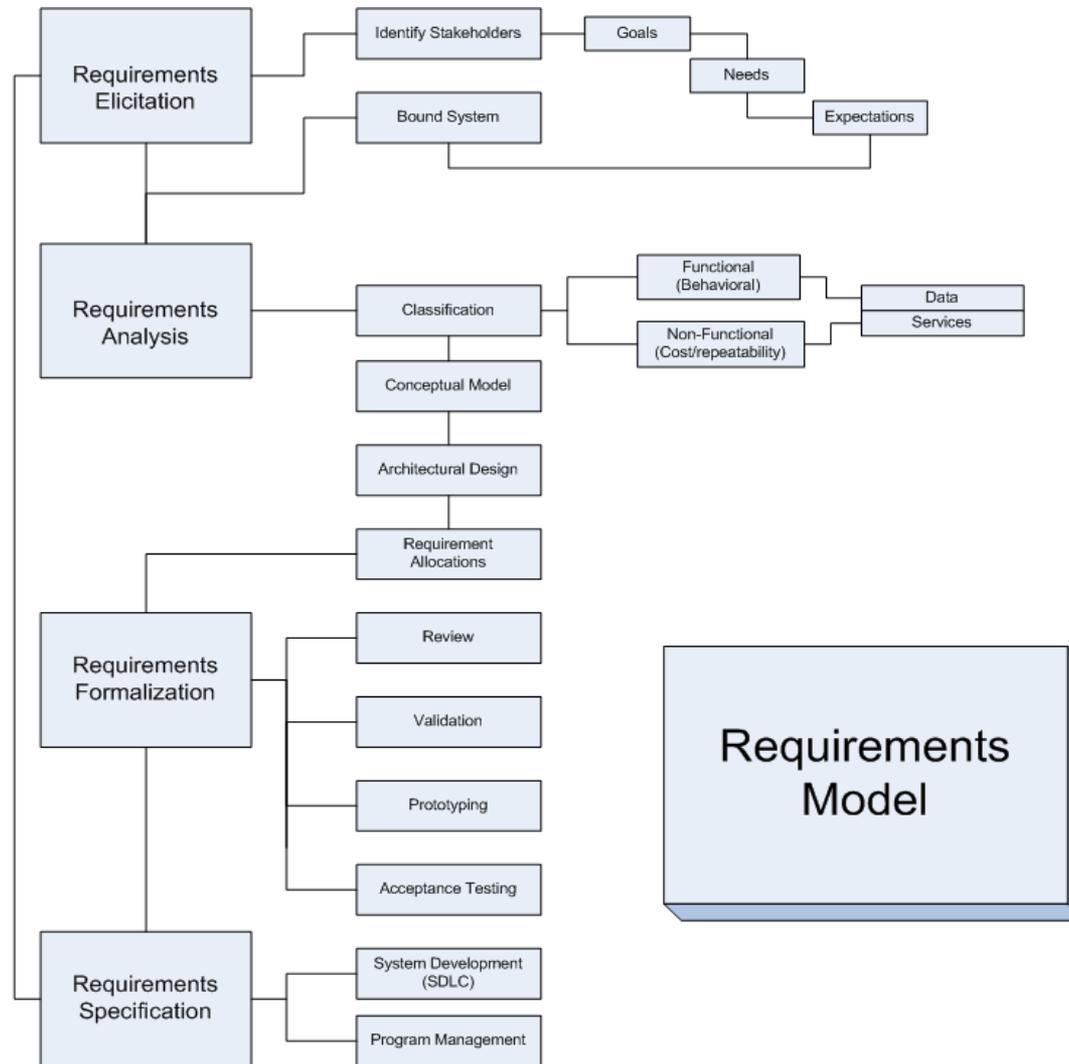
- Identify and Define a Requirements Model
- Identify/define expected outcomes/functions
- Bound the effort
- Develop a plan
- Estimate/Identify resources
- Implementation

Program Drivers

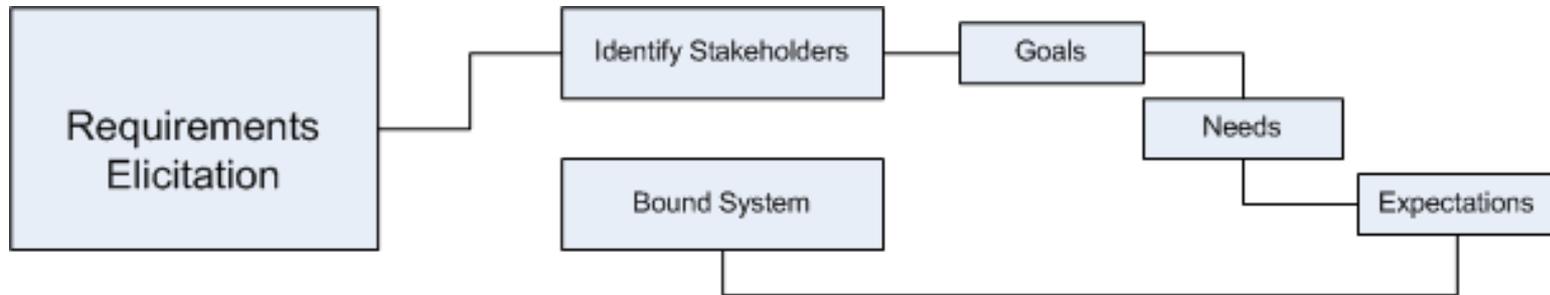
- Develop process to inform the National Land Imaging Program
 - Platform/Sensor independent
- Provide measures to inform program/component justification
 - Landsat
 - Enhanced Elevation for the Nation
 - Imagery for the Nation
 - Other sensor modalities
- Inform systems/sensors design and development process
 - Landsat 8-9 validation
 - Landsat 10 design
- Inform services development
 - Processing
 - Exploitation
 - Dissemination



Requirements Model

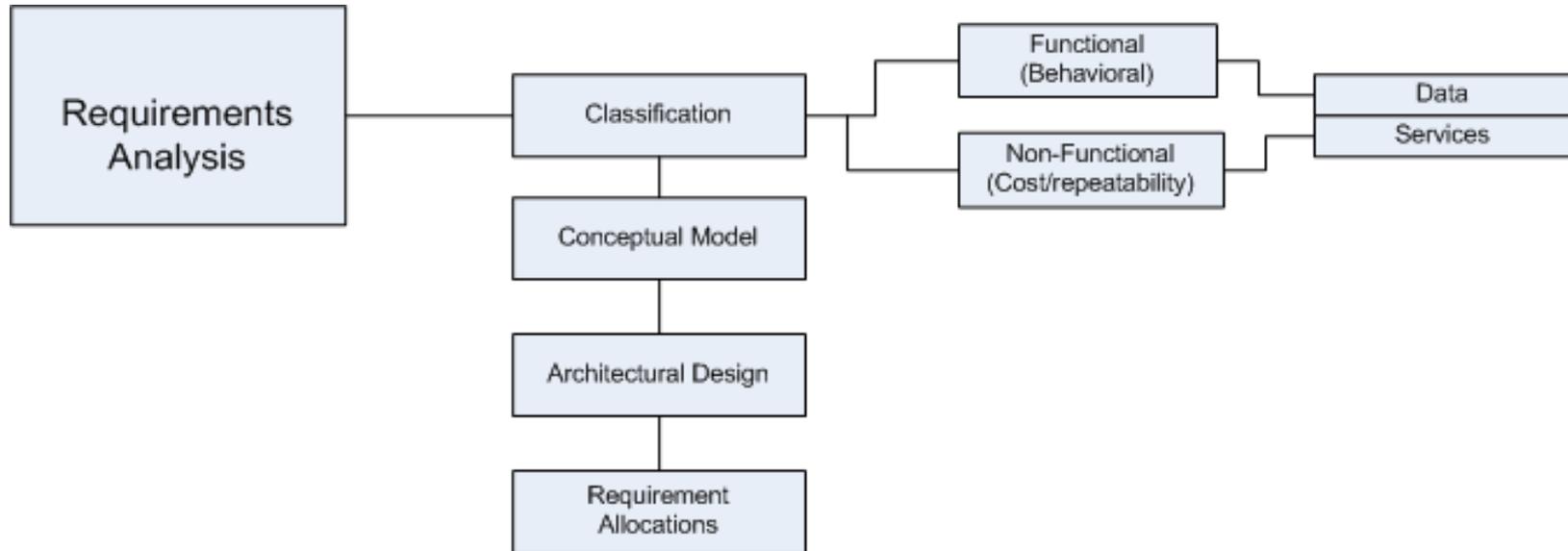


Elicitation



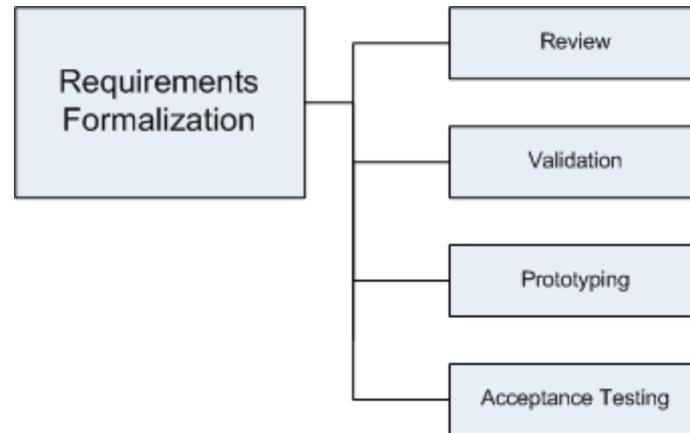
- Gather stakeholder expectations, needs, higher-level requirements, and capture the information as candidate requirements.
 - requirements can be both functional and non-functional in context.
- The sources of the requirements can include, but are not limited to, operational requirements documents, mission needs, technology opportunities, sponsor direction, budgetary contexts.
- This process will be iteratively informed through interaction with the analysis and through decomposition of the scope of requirements to be addressed.
- Refining the elicitation is informed by categorization and prioritization of candidate requirements for analysis.

Analysis



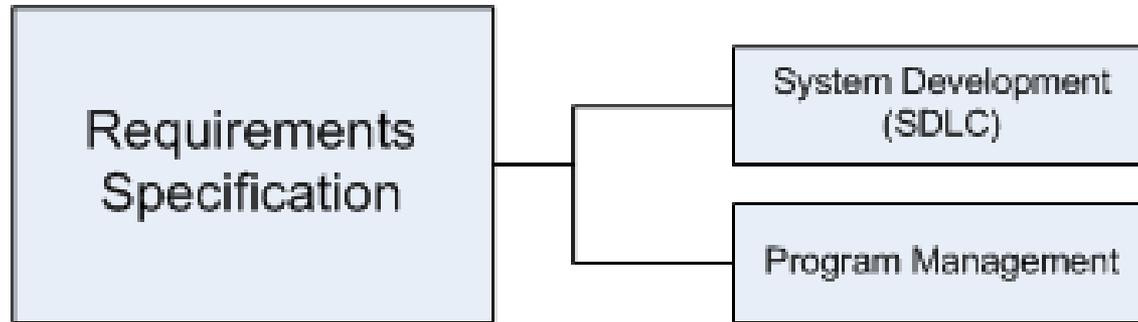
- Transform the candidate requirements into informal requirements that meet the acceptance criteria for requirements (e.g. clear, complete, uniquely-identified, consistent with each other, appropriate to implement, testable, and traceable).
- Analysis includes classification of requirements and development of a model to associate requirements with potential solutions for systems and or services.

Formalization/Validation



- Translate the informal requirements data into a form that clearly communicates them in terms of projected solutions.
- The specification document and associated requirements tracing documentation are approved and define the functional performance baseline.
- Provide assurance that the requirements as formally presented accurately reflect the stakeholder's use expectations.
- Each of the stakeholders verifies that the requirements are properly understood as transformed in the system.

Specification



- On concurrence that the system requirements specification meets mission objectives and that the acceptance criteria have been met, the specifications are approved and the baseline determined ready for operations.
- This activity accepts project requirements as inputs and outputs solutions to inform decision makers and to provide input to appropriate systems and programs development plans.

Data Model/Classification

- Starting with the Global Change Master Directory
 - http://gcmd.nasa.gov/Resources/valids/archives/keyword_list.html
 - GCMD Science Keywords
 - GCMD Service Keywords
 - GCMD Data Resolution Keywords
- NOAA Requirements Model uses same/similar taxonomy
- Adapt and modify as needed

Research Existing Information

- Consider previous elicitations for requirements and aggregates of valuable customer information
 - CRS Long term Requirements
 - Geospatial One Stop
 - NOAA Requirements DB, TPIO
 - DOD Requirements
 - Agriculture requirements
 - Enhanced Elevation survey
 - Landsat Survey
 - DHS Requirements
 - FEMA MapMod
 - NSGIC Ramona
 - Others
- Proactively integrate extracted information prior to new elicitations



System Development Needs

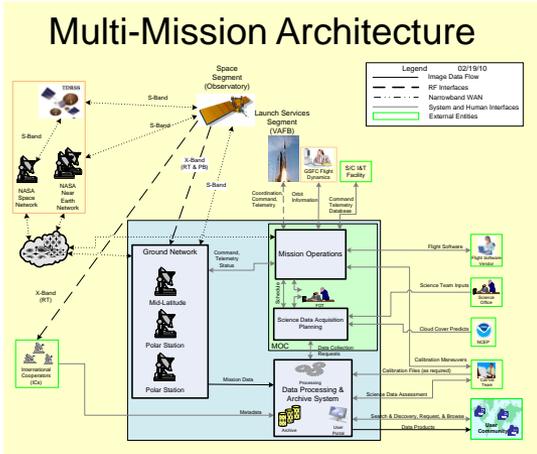
- Mission Duration
 - Revisit cycles
 - Life expectancy
 - Consumables
- Instrument Performance Specifications
 - Spectral
 - Spatial
 - Temporal
 - Other
- Platforms
 - Satellite
 - Airborne
 - In situ



Requirements & Systems Lifecycle

Elicit & Analyze
Planned Mission
Outcomes and Results

Research &
Development



Operational
Analysis

Requirements
& Technology

Multi-Mission System
Operations &
Maintenance

System
Development,
Modernization &
Enhancement

Operational
Analysis

Systems &
Enhancements



Goals

- Develop requirements model and specifications in FY11
 - Consideration of prior art
- Develop implementation plan in FY11
- Fully resourced implementation for FY12
- Program justification for L8-L10
- Provide support for 2013 budget justification
- Initiate elicitations to partners in FY12
- Inform systems development life cycle for Landsat 10
- Support initiation of the NLIP

NOAA Consolidated Observation Requirements List (CORL)

User Information	
User Type	U.S. Federal Government Agency
User ID - Level 1	DOC
User ID - Level 2	NOAA
NOAA Goal	Commerce & Transportation
NOAA Program	Aviation Weather
Program Acronym	CT-AWX
Sub-Program Acronym	na
User POC:	Name: Cynthia Abelman Phone: 301-713-1726 x140 Email: cyndie.abelman@noaa.gov
Requirement Classification	
Observation Requirement	Air Temperature: Profiles Global
Observation Priority	1
Validation Documentation (Priority-1s ONLY)	NFS_5174_Data Requirement for WMO.pdf NFS_5297_CT-AWX Program Charter_06_19_09.pdf
Validation Complete (Yes/No)	Yes
Associated Performance Measure(s)	Performance Measure - CT-AWX - Accuracy of Convective Forecasts
NOAA Regional Collaboration Priority Areas	
GCMC Topic	Atmosphere
GCMD Term	Atmospheric Temperature
NOAA GCMD Variable	Air Temperature: Profiles
Observation Requirement Type	P (physical)
Requirement Weight - Differential Goals	5.67E-05
PALMA ID	AWX-R103
Observing Requirement Timeline	



NOAA Consolidated Observation Requirements List (CORL)

<u>Observing Requirement Specification</u>	<u>Threshold</u>	<u>Objective</u>
Geographic Coverage	Global	Global
Geographic Coverage Weight	20	20
Vertical Range Low	2	2
Vertical Range High	18	18
Vertical Range Units	km	km
Vertical Range Weight	5	5
Vertical Resolution	1	0.3
Vertical Resolution Units	km	km
Vertical Resolution Weight	15	15
Vertical Resolution Preferred Trend	Decreasing	Decreasing
Horizontal Resolution	100	15
Horizontal Resolution Units	km	km
Horizontal Resolution Weight	15	15
Horizontal Resolution Preferred Trend	Decreasing	Decreasing
Measurement Range Low	200	195
Measurement Range High	320	325
Measurement Range Units	K	K
Measurement Range Weight	5	5
Measurement Accuracy	1	0.5
Measurement Accuracy Units	K	K
Measurement Accuracy Weight	20	20
Measurement Accuracy Preferred Trend	Decreasing	Decreasing
Sampling Interval	6	1
Sampling Interval Units	hr	hr
Sampling Interval Weight	5	5
Sampling Interval Preferred Trend	Decreasing	Decreasing
Data Latency	1	30
Data Latency Units	hr	min
Data Latency Weight	15	15
Long-Term Stability	na	na
Long-Term Stability Units	na	na
Long-Term Stability Weight	0	0
Number ODS/Flt Hrs/HODs	na	na
Number ODS/Flt Hrs/HODs Units	na	na
Number ODS/Flt Hrs/HODs Weight	na	na

