



INDEPENDENT TECHNOLOGY ASSESSMENT WITHIN THE ESIP TESTBED

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18 December 2016 | AGU Fall Meeting

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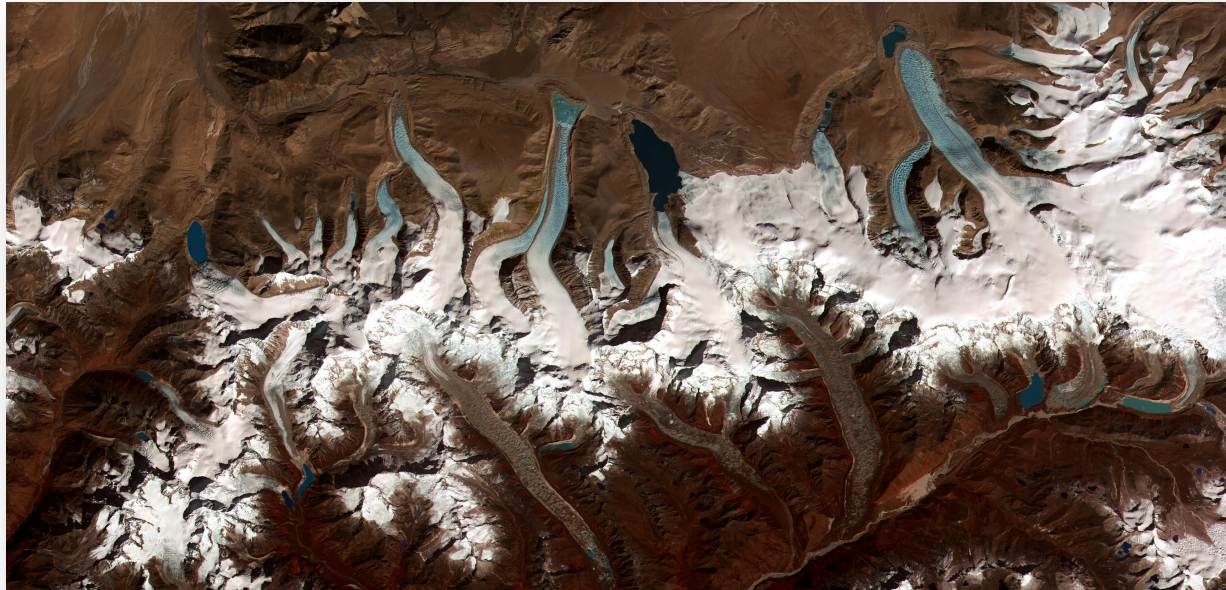
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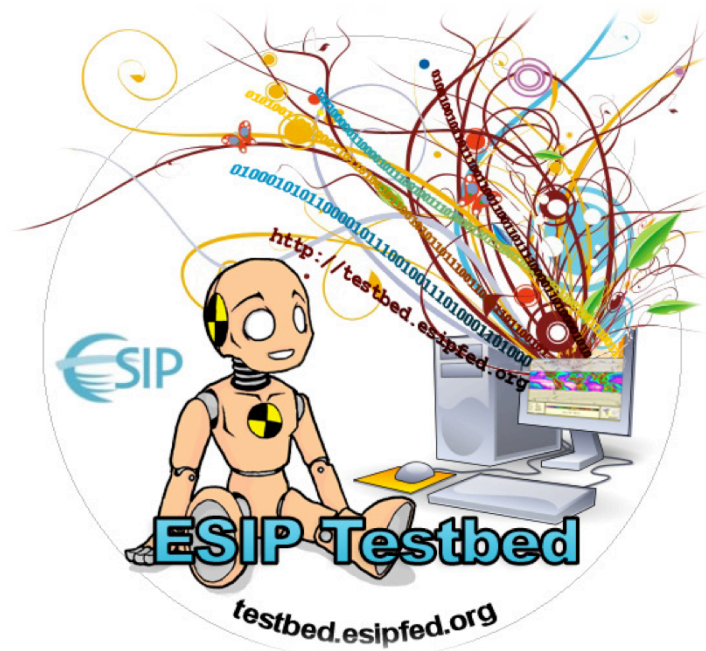
- **EVALUATION NEED**

Earth sciences technologies benefits from diverse perspectives and end-user input.



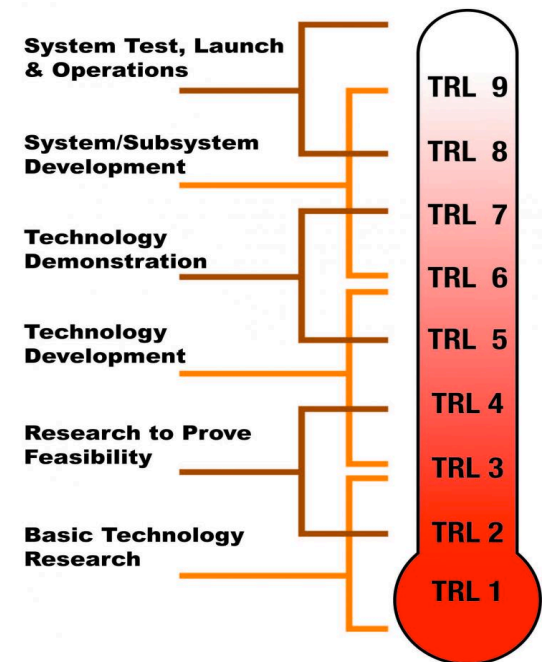
- **ESIP TESTBED**

- Workspace for projects to mature and gain visibility.
- Funding mechanism for project development.
- Framework for technology evaluation.



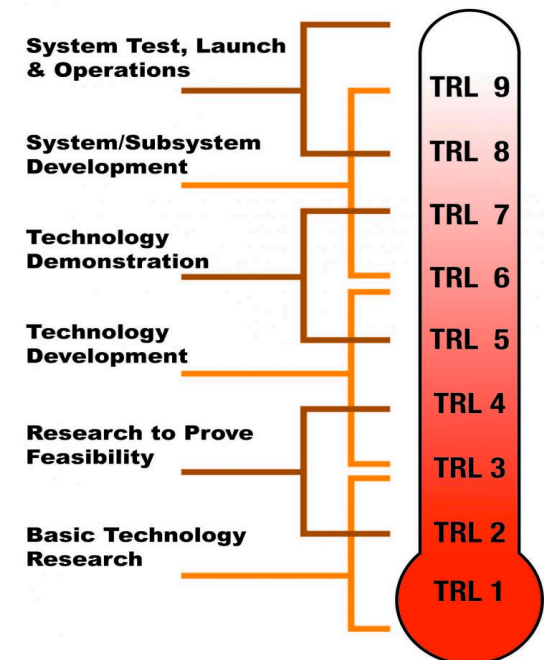
- **BACKGROUND**

- NASA's Advanced Information Systems Technology (AIST) Program supports information technology development.
- A Technology Readiness Level (TRL) is used to assess project maturity.



• BACKGROUND

- NASA's Advanced Information Systems Technology (AIST) Program supports information technology development.
- A Technology Readiness Level (TRL) is used to assess project maturity.
- TRL assessment is internal only.
- Research to operations transitions have suffered from surprises in technology adoption.



• ESIP/AIST COLLABORATION

ESIP was tasked with:

- Providing an independent assessment of AIST project TRL.
- Identifying opportunities/roadblocks for project infusion within the broader Earth science community.



• EVALUATION GOALS

- Achieve consistency, traceability and defensibility of evaluation results.
- Be recognized as comprehensive and fair.
- Provide a valuable experience for PIs and project evaluators.

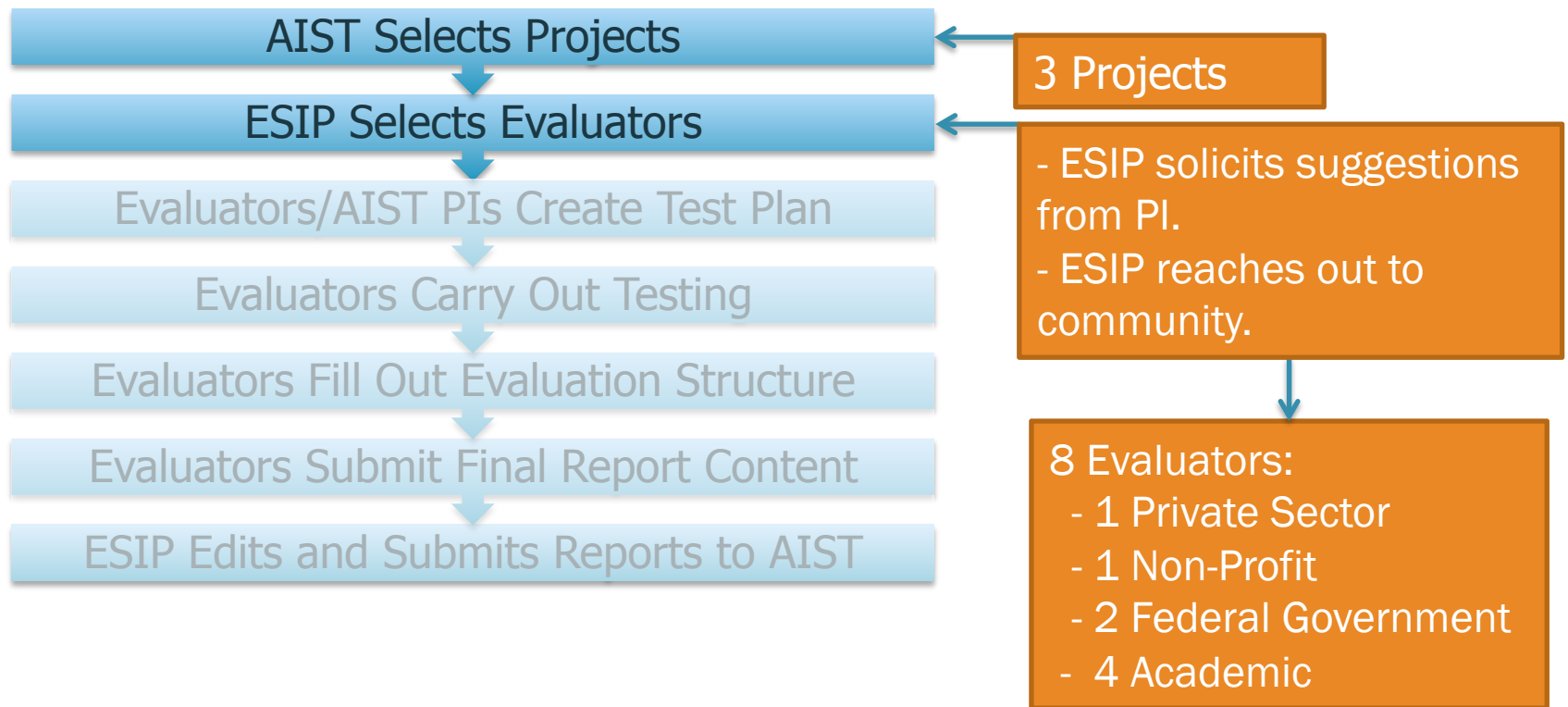


TIMELINE

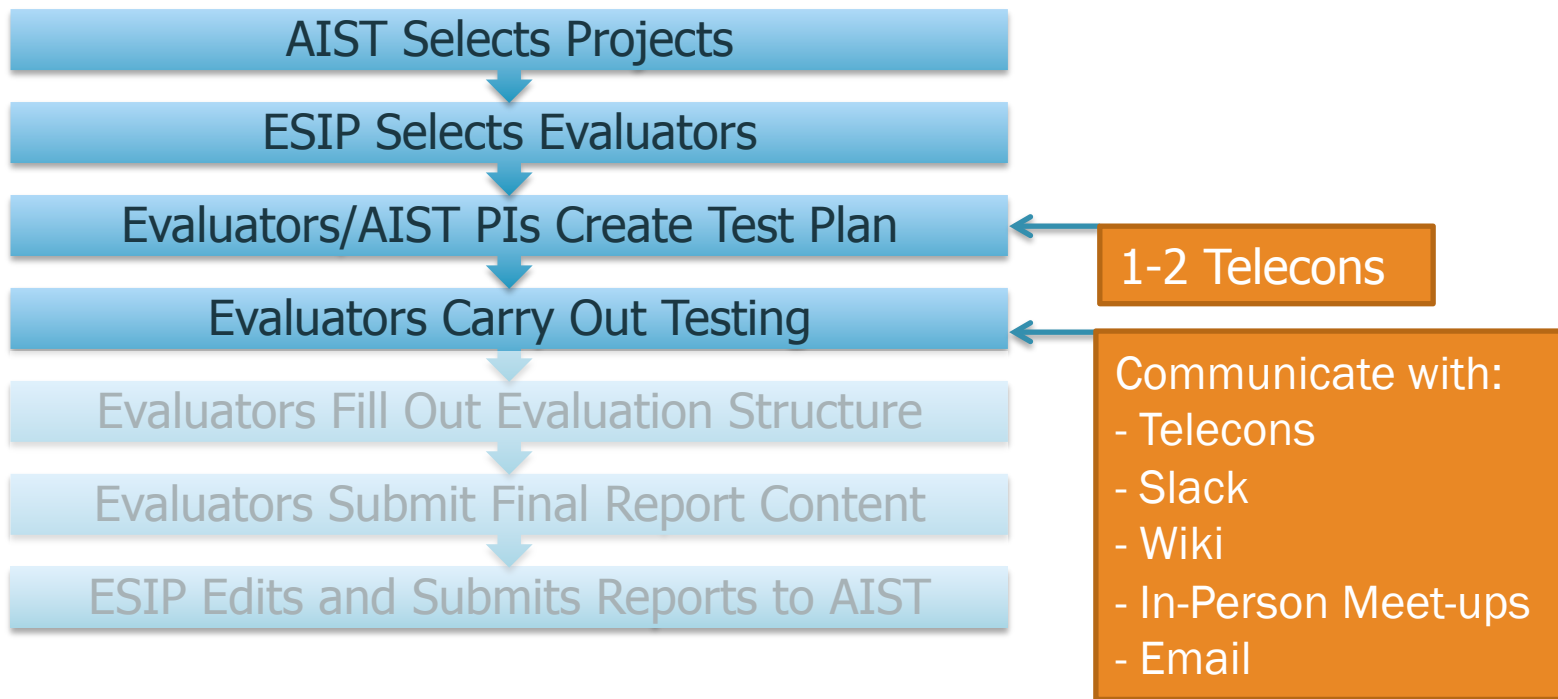
| | Lead Time | Aug 1 | Aug 15 | Sep 1 | Sep 15 | Oct 1 | Oct 15 | Nov 1 | Nov 15 | Dec 1 |
|--------------------------------------|-----------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| Project Selection | Orange | Grey | Grey | | | Grey | Grey | | | Grey |
| PI Communications | Blue | Blue | Blue | | | Grey | Grey | | | Grey |
| Evaluator Selection | | Grey | Blue | Blue | Blue | Grey | Grey | | | Grey |
| Intro. Telcons + Planning | | Grey | Grey | | Red | Red | Grey | | | Grey |
| Testing Period | | Grey | Grey | | | Red | Red | Red | | Grey |
| Evaluators Final Report Prep. | | Grey | Grey | | | Grey | Grey | Red | | Grey |
| ESIP Final Report Prep. | | Grey | Grey | | | Grey | Grey | | Blue | Grey |
| Reports Submitted to AIST | | Grey | Grey | | | Grey | Grey | | | Blue |

AIST 
 ESIP 
 Evaluators 

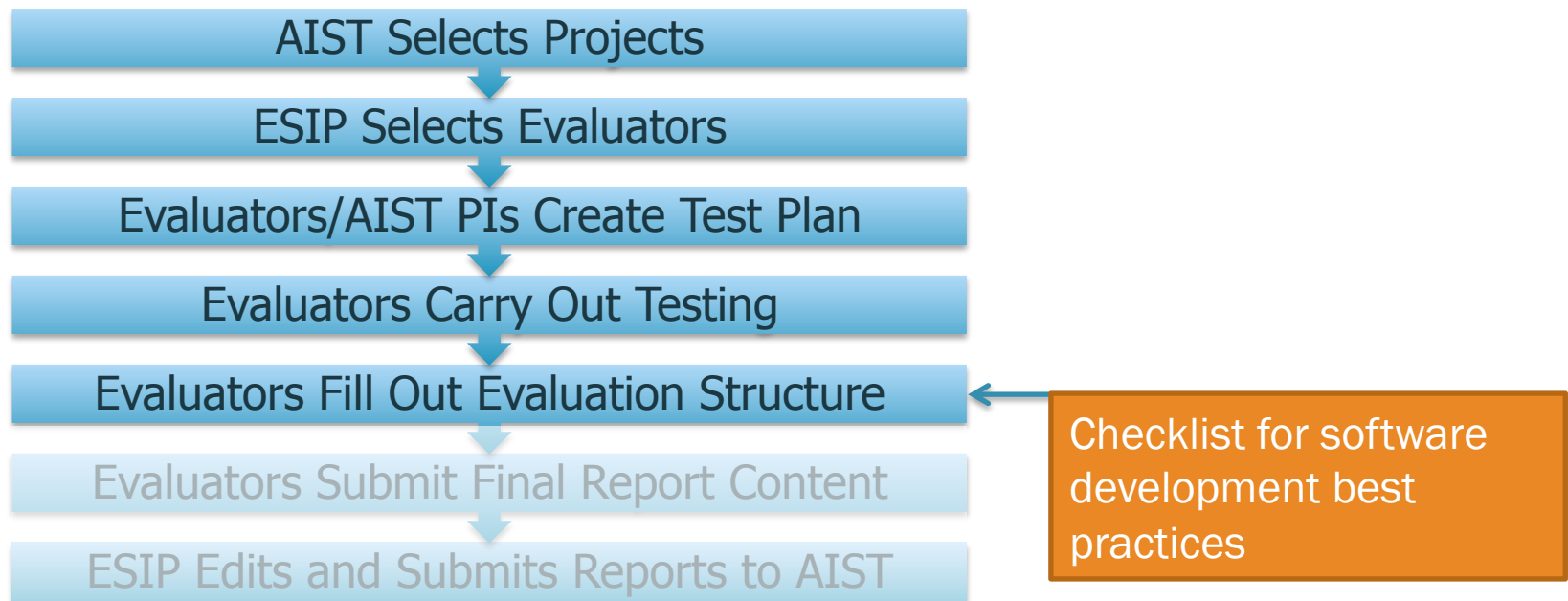
• WORKFLOW



• WORKFLOW



- **WORKFLOW**



CHECKLIST FOR SOFTWARE DEVELOPMENT BEST PRACTICES

- Supportability
- Portability
- Testability
- Accessibility
- Community
- Governance
- Licensing
- Copyright
- Installability
- Buildability
- Learnability
- Documentation
- Understandability
- Friendliness

The screenshot shows a Google Sheets spreadsheet with the following data:

| Group | Category | Criteria Question | Your Rating | TRL Weight | Weighted Rating | Comments of the Evaluation Team | |
|--|-----------|-------------------|---|----------------------------|-----------------|---------------------------------|---|
| TRL Evaluation Structure Version 1.0.1 Enter TRL Level to Evaluate >> TRL6 Filter 91% << % RANKING (100% = Perfect score for TRL level) | | | | | | | |
| Criteria Questions | | Get Help | | SUM TOTALS >> | | | |
| 4 | Usability | Friendliness | User interfaces are organized in meaningful and useful ways that are recognizable to users. | 1 | 0.8 | 0.8 | We experienced the user interface in an extended demonstration. Overall the interface is well developed for a TRL-6 project. Future improvements to the interface are possible especially when it comes to explanation of acronyms and providing broader access (currently limited by export control restrictions) |
| 5 | Usability | Friendliness | Simple and common tasks are easy to perform and communicated clearly and simply in the user's reference frame. The product minimizes the effort for users, by making appropriate assumptions, presenting appropriate defaults, and offering appropriate short-cuts. | 1 | 0.7 | 0.7 | The interface allows for faceted search, allow easy subsetting of data by spatial and temporal baselines as well as by platform, sensors and other parameters. |
| 6 | Usability | Friendliness | All essential options and information for a task are visible, while excess information is avoided. Display elements are easily distinguished, and tool tips provided. Possible and impossible actions are indicated. | 1 | 0.6 | 0.6 | Essential information available and excess information is avoided on the interface. Display elements are easily distinguished. Possible and impossible actions are indicated |
| 7 | Usability | Friendliness | Users are informed of relevant software actions, state changes, errors, and assumptions in clear and simple ways. | 1 | 0.6 | 0.6 | Versioning system; working on an approach to automatically detect phase unwrapping errors (machine learning) -- currently they rely on users for tagging data with errors. Users are informed of assumptions but the information may still be a bit to high-level for novice users. A bit more general user documentation would be useful to make some of the processing assumptions more transparent. Processing errors are logged and can be monitored using a "resource monitor" function. |
| 8 | Usability | Friendliness | User commands are quickly and intuitively reflected in system behavior and subsequent system presentation (e.g., previous filters remain visible). | 1 | 0.8 | 0.8 | Most intermediate steps are kept and made available (e.g., InSAR; d-InSAR; coherence map; unwrapped interferogram) - those can be selected sort of Amazon-style through selection tabs. This functionality is powered by the faceted search capabilities of the system. |
| | Usability | Friendliness | Terminology used throughout the system or product | 1 | 0.7 | 0.7 | The terminology is kept consistent throughout the system and is also kept |

200+ questions about software development

CHECKLIST FOR SOFTWARE DEVELOPMENT BEST PRACTICES

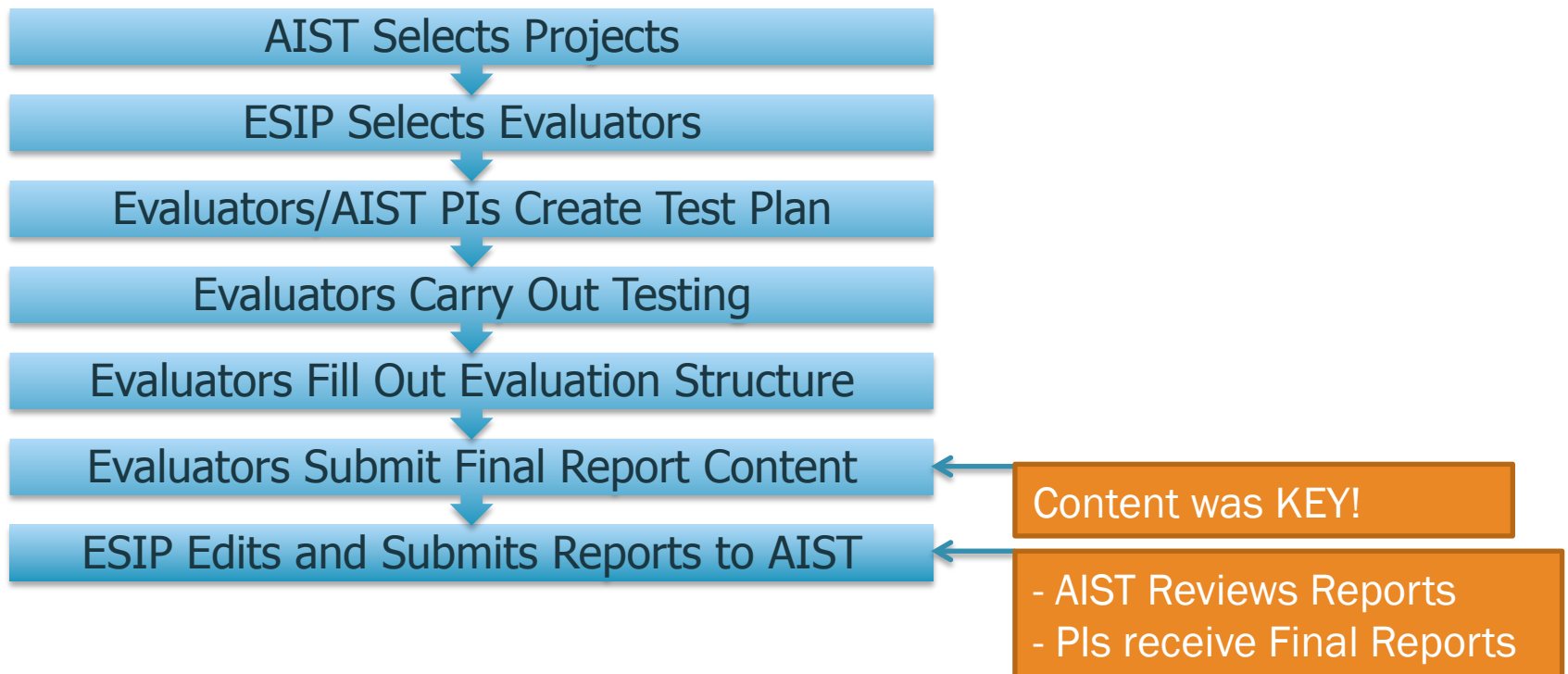
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The screenshot shows a Google Sheet titled "TRL Evaluation Structure - Final" with the following data:

| 1 | TRL Evaluation Structure | Version 1.0.1 | Enter TRL Level to Evaluate >> | TRL6 | Filter | 91% | << % RANKING (100% = Perfect score for TRL level) |
|---|--------------------------|---------------|---|-------------|------------|-----------------|---|
| 2 | Criteria Questions | Get Help | SUM TOTALS >> | Your Rating | TRL Weight | Weighted Rating | Comments of the Evaluation Team |
| 3 | Group | Category | Criteria Question | | | | |
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200+ questions about software development

• WORKFLOW



- FEEDBACK

- + Multiple communication choices.
- + Compensation.
- + Selecting evaluators from potential infusion sites.
- Short evaluation period lead time.
- Software best-practices checklist overly complex.

• LESSONS LEARNED

- Start evaluation with a technical exchange meeting.
 - Motivation
 - Challenges (Technology access)
 - Infusion Potential
- Diversify evaluation teams with domain and technical expertise.
- Each evaluation will be different, coordination and communication are KEY!

• OUTLOOK

Provide the Earth sciences community with a novel, needed evaluation framework to improve technology development and infusion potential.



• PARTICIPANTS

Evaluators



SMU

FIU

FLORIDA
INTERNATIONAL
UNIVERSITY



esri



PIs



Marshall Space
Flight Center



THE UNIVERSITY OF
ALABAMA IN HUNTSVILLE



THANK YOU!

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