Traceability

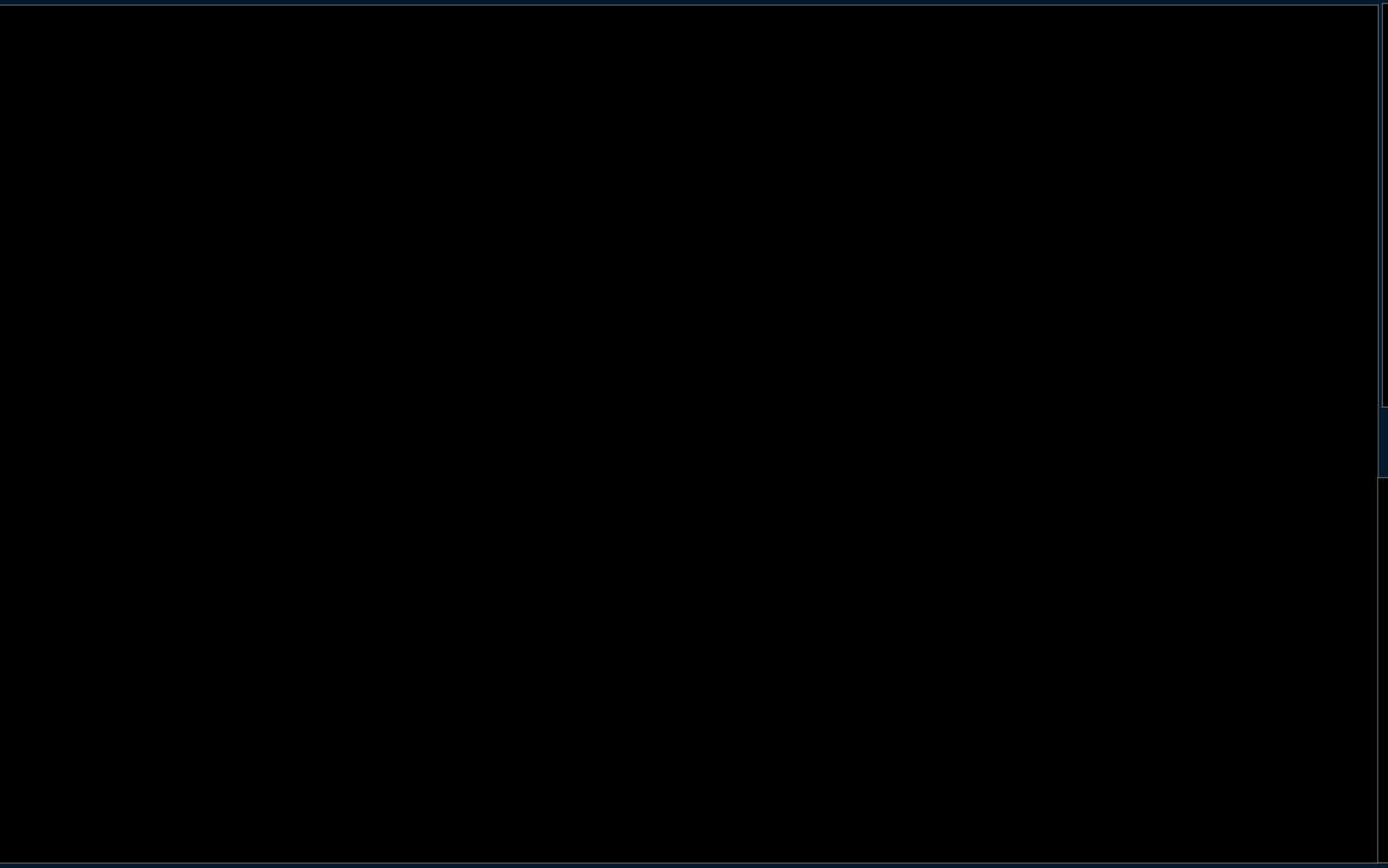
Improving organization performance

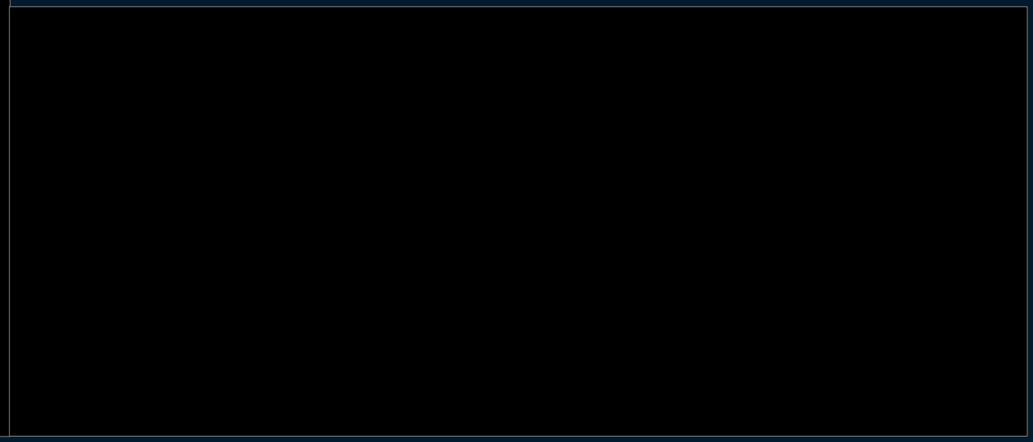
2019 SKA Shanghai Meeting

PRESENTER: **Rupert Spann**

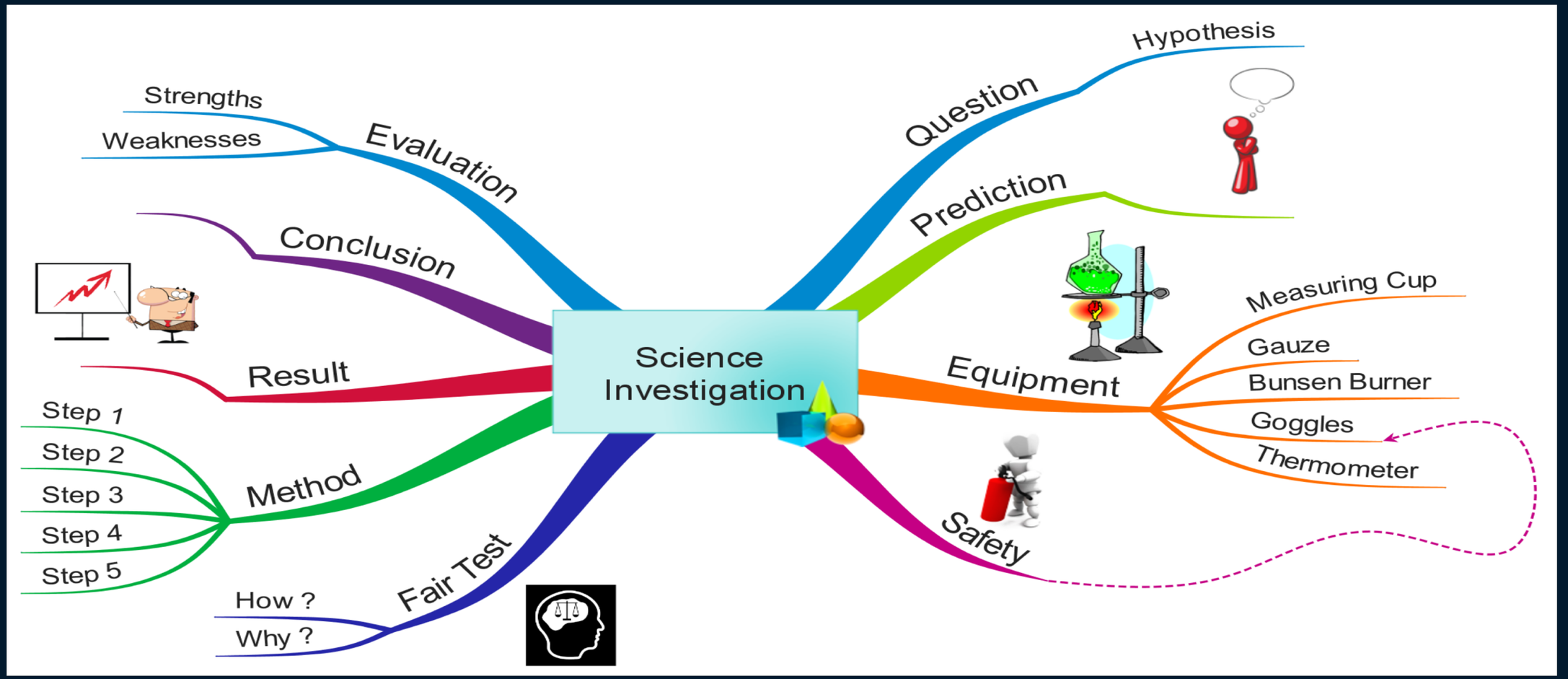
National Research Foundation

A different perspective

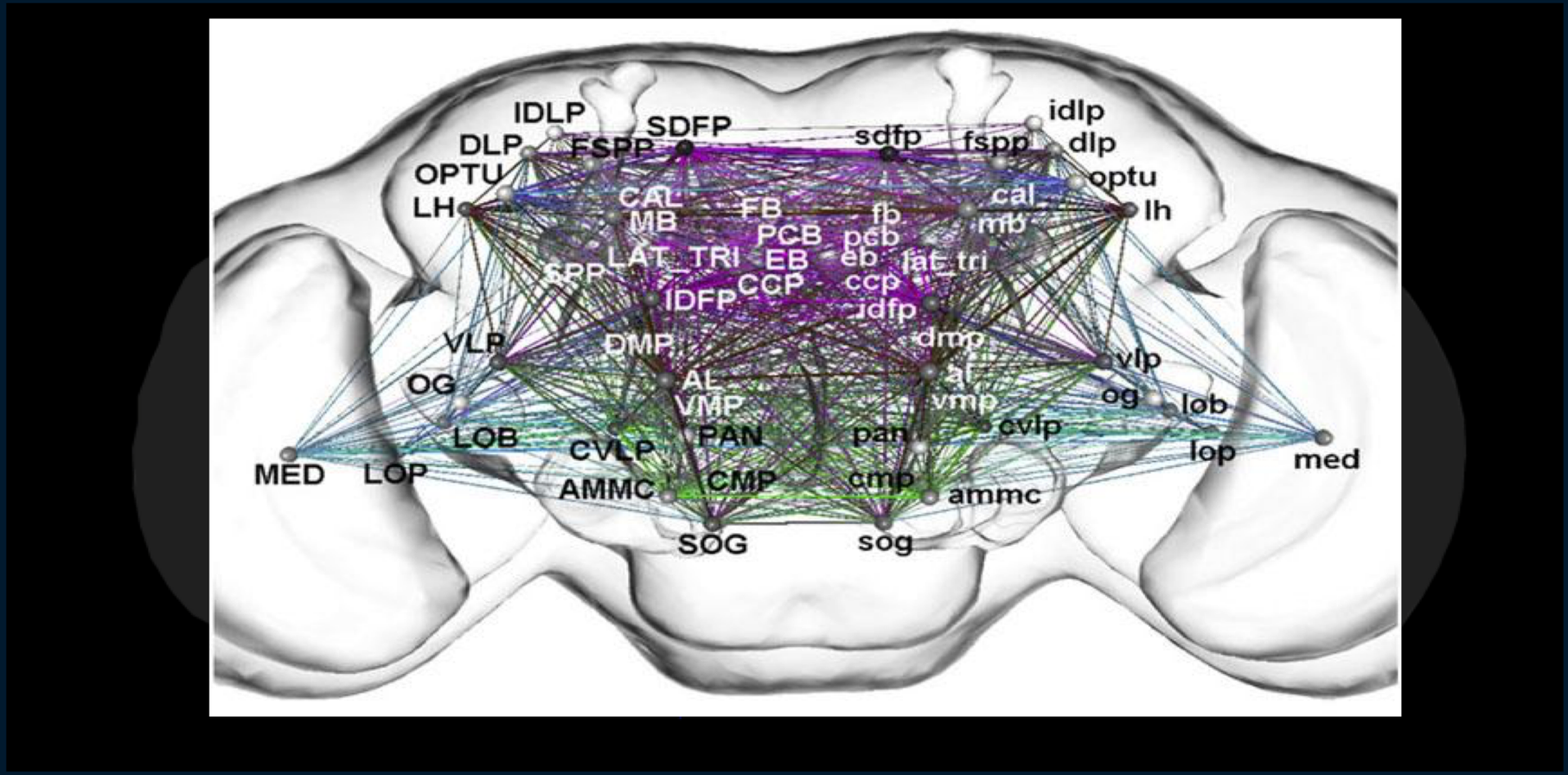




Design by Mind-map vs reality



Design by Mind-map vs reality



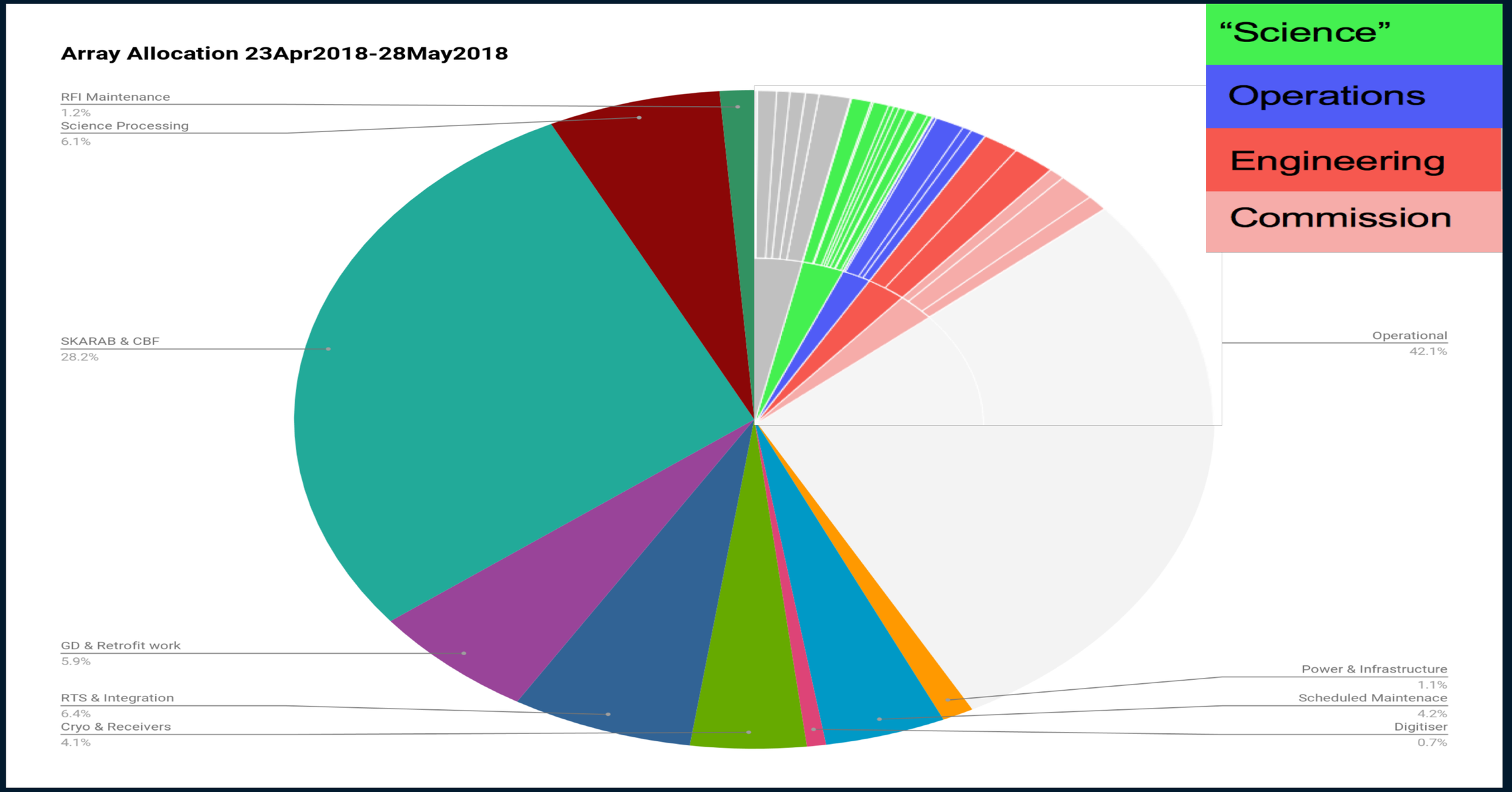
Container Terminal Operations

- Ensure optimal resource usage
  - Invest in Bottle-necks to maximize resource usage
- Optimization of usage of “critical” investment
  - Have excess supplies and services to support

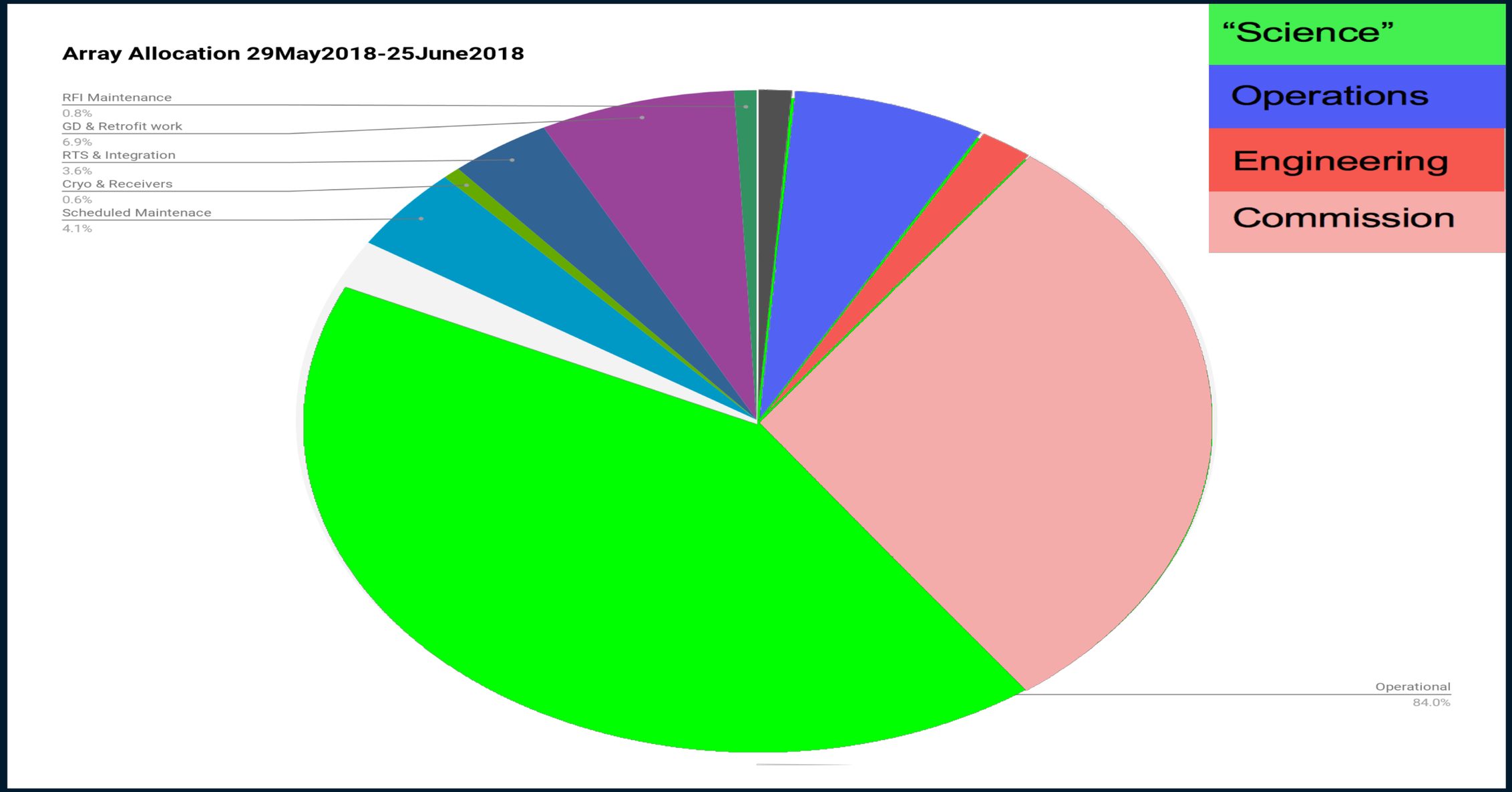
- *....Could Consider:*
- *Containers as required observations,*
- *Ships as when then can be done,*
- *Cranes as the telescope combining the resources.*
-

To Improve a
system,
we need to measure the
system.

Telescope Operations



Telescope Operations



Optimization of usage of **critical investment**

> *“As far a weighted usage goes, sometime we might just be using 4 antennas (say for some pulsar test), and that's all we want, so we're using the telescope just as we want it – so thats 100% success.”*

Science Operations VS Telescope Operations

Optimization of usage of **critical investment**

“As far a weighted usage goes, sometime we might just be using 4 antennas (say for some pulsar test), and that's all we want, so we're using the telescope just as we want it – so thats 100% success”

production system which is the process

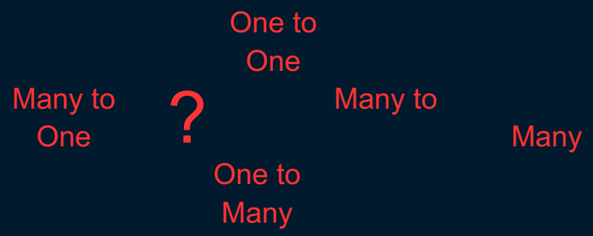
that converts inputs into outputs.

concerned with the design, building,

and use of machines, and structures.

systematic study of the structure and

behavior of the physical and natural.

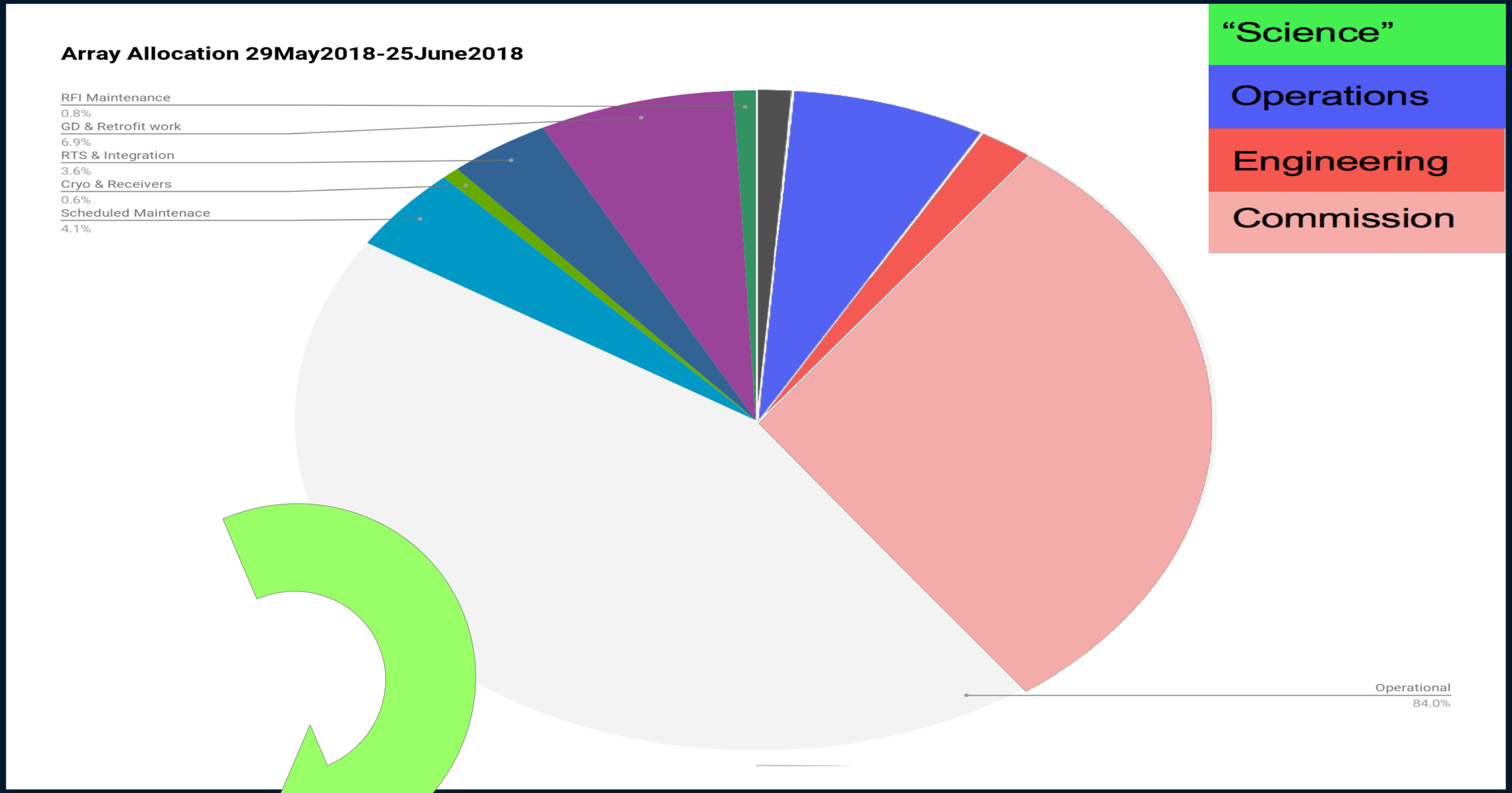


Science Operations

Telescope Operations

Engineering Operations

Telescope Operations

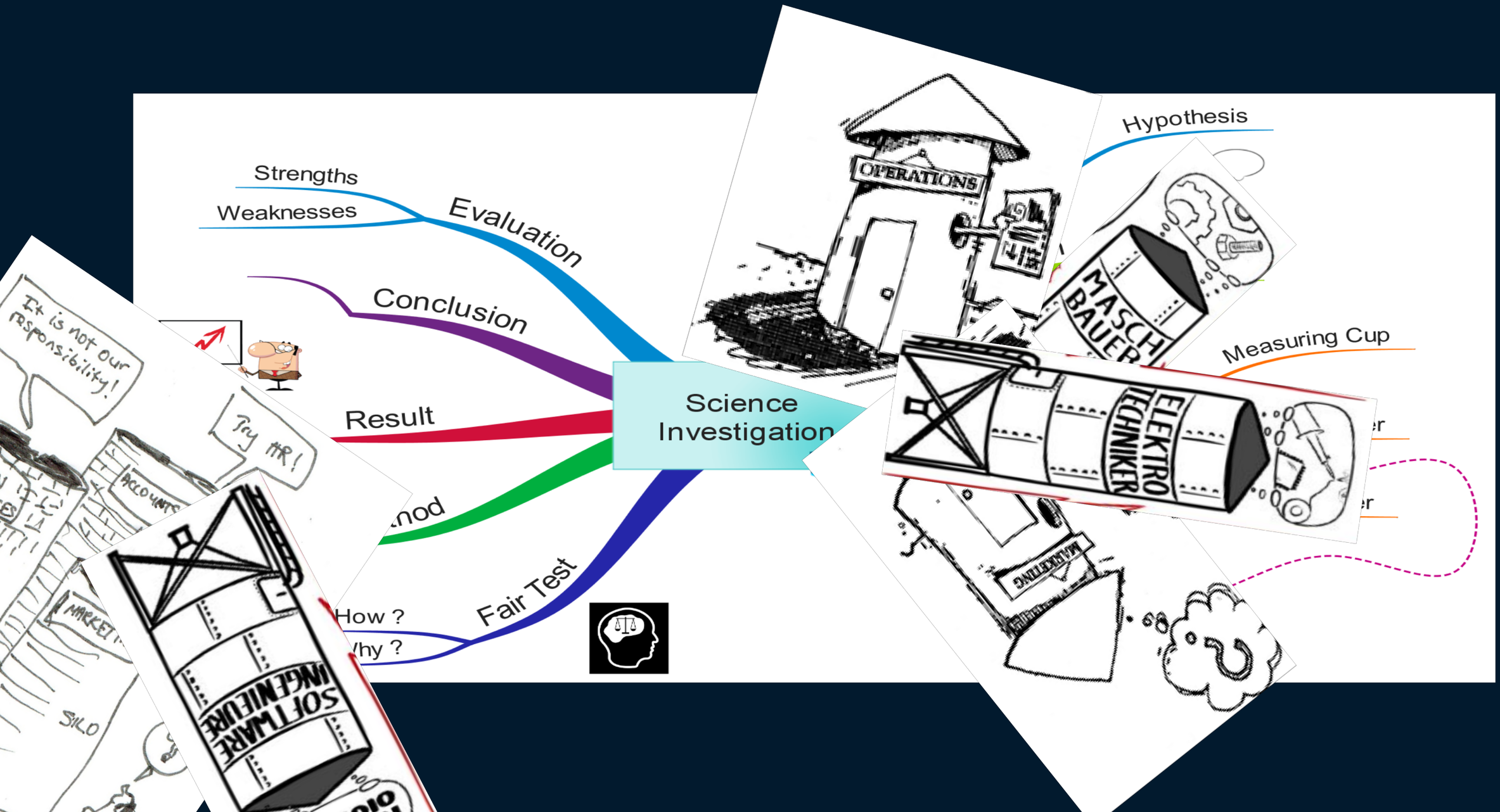


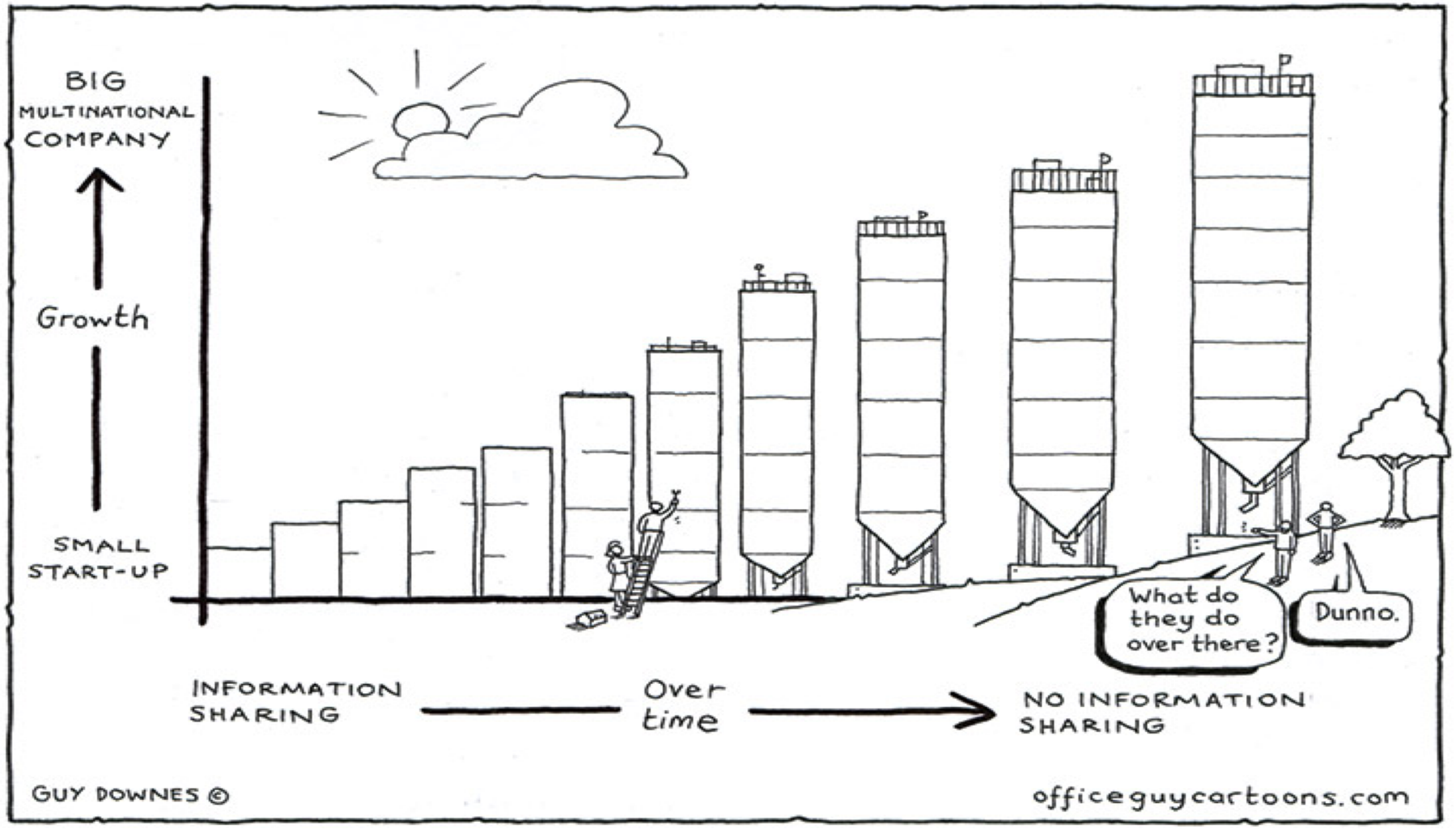
Is it possible to track how long and why the system is unavailable?

The tools are are there...

Do we trace the system unavailability?

Side effect of Design by Mind-map

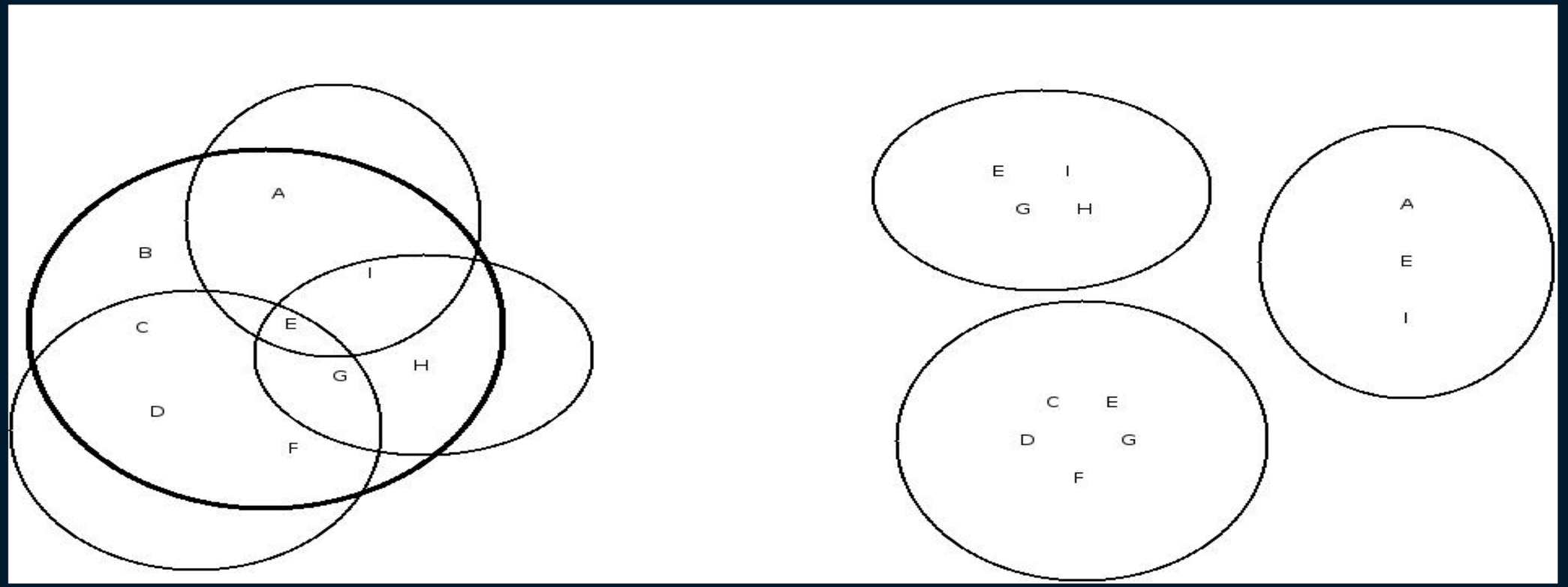



BIG
MULTINATIONAL
COMPANY
Growth
SMALL
START-UP
What do they do over there?
Dunno.
INFORMATION SHARING
Over time
NO INFORMATION SHARING
GUY DOWNES ©
officeguycartoons.com

Do you find...

- Don't investigate – it will take to long.
- Nobody knows when it changed or why. (Somebody did it for some other reason)
- “I think” … (difficulty in verification – time it takes to get data)
- Time it takes to access / find information.
- Broken chain of emails or messages.
- Procedures of procedures and deviations of procedures. (....and the duplication of information)
- Irrelevant information overload.

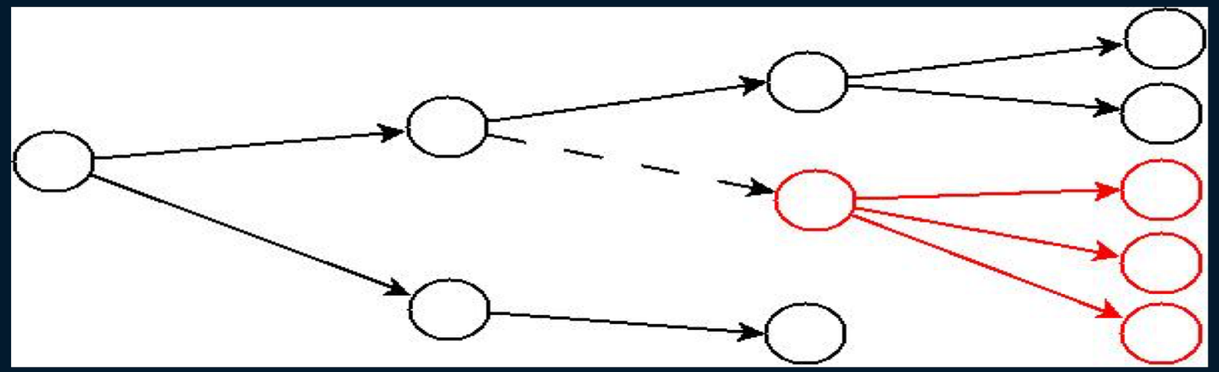
Single source of Data



Some issues with current information model

Broken telephone

Dependencies



Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors (Infrastructure & instruments)
- Data Archive
- Fault-ticket (JIRA)
- Configuration (Hard/Software Release,GitHUB)
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server (eB / Engineering / Procedures)
- Maintenance System (RAMLOG)
- Weather (forecast & observed)
- Flights (flightradar.com & COMRAD & ATNS)
- Satellite
- RFI database(s)
- Geographic (GIS)
- Enterprise Management System (HR / Purchasing)
- Onsite hosted instruments (logs,docs,etc.)
- Site visits
- Security logs
- Contractors (SKA Construction, ...)
- User Logs
- ...

.Scheduling
.Analytics
.Reporting
.Planning
.Performance analysis
.Sensor Analytics
.Health & Safety
.Security Access
.Fault correction
.
.Deep learning
.Predictive behavior
.Digital assistance
.
.Virtual Observatory
....

REAL TIME
Dynamics
Adaptable

Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors
- Data Archive
- Fault-ticket
- Configuration
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server
- Maintenance System
- Weather
- Flights
- Satellite
- RFI database(s)
- GIS
- Enterprise Management System
- Onsite hosted instruments
- Site visits
- Security logs
- Contractors
- User Logs
- ...

.Scheduling

.Analytics

.Reporting

.Planning

.Performance analysis

.Sensor Analytics

.Health & Safety

.Security Access

.Fault correction

.

.Deep learning

.Predictive behavior

.Digital assistance

.

.Virtual Observatory

....

REAL TIME

Dynamics

Adaptable

Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors
- Data Archive
- Fault-ticket
- Configuration
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server
- Maintenance System
- Weather
- Flights
- Satellite
- RFI database(s)
- GIS
- Enterprise Management System
- Onsite hosted instruments
- Site visits
- Security logs
- Contractors
- User Logs
- ...

- **Scheduling**
- **RFI Analytics**
- **Reporting**
- **Planning**
- **Performance analysis**
- **Sensor Analytics**
- **Health & Safety**
- **Security Access**
- **Fault correction**
- .
- **Deep learning**
- **Predictive behavior**
- **Digital assistance**
- .
- **Virtual Observatory**
- ....

REAL TIME

Dynamics

Adaptable

Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors
- Data Archive
- Fault-ticket
- Configuration
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server
- Maintenance System
- Weather
- Flights
- Satellite
- RFI database(s)
- Geographic
- Enterprise Management System
- Onsite hosted instruments
- Site visits
- Security logs
- Contractors
- User Logs
- ...

- **Scheduling**
- **Analytics**
- **Reporting**
- **Planning**
- **Performance analysis**
- **Sensor Analytics**
- **Health & Safety**
- **Security Access**
- **Fault correction**
- .
- **Deep learning**
- **Predictive behavior**
- **Digital assistance**
- .
- **Virtual Observatory**
- ....

REAL TIME

Dynamics

Adaptable

Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors
- Data Archive
- Fault-ticket
- Configuration
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server
- Maintenance System
- Weather
- Flights
- Satellite
- RFI database(s)
- GIS
- Enterprise Management System
- Onsite hosted instruments
- Site visits
- Security logs
- Contractors
- User Logs
- ...

- **Scheduling**
- **Analytics**
- **Reporting**
- **Planning**
- **Performance analysis**
- **Sensor Analytics**
- **Health & Safety**
- **Security Access**
- **Fault correction**
- .
- **Deep learning**
- **Predictive behavior**
- **Digital assistance**
- .
- **Virtual Observatory**
- ....

REAL TIME

Dynamics

Adaptable

Data sources

- Observation Requests
- Observation Schedule Blocks
- System Sensors
- Data Archive
- Fault-ticket
- Configuration
- Docker
- IRC
- Emails
- Observation Reports
- PI feedback
- Cloud Spreadsheets & Docs
- Document Server
- Maintenance System
- Weather
- Flights
- Satellite
- RFI database(s)
- GIS
- Enterprise Management System
- Onsite hosted instruments
- Site visits
- Security logs
- Contractors
- User Logs
- ...

- **Scheduling**
- **Analytics**
- **Reporting**
- **Planning**
- **Performance analysis**
- **Sensor Analytics**
- **Health & Safety**
- **Security Access**
- **Fault correction**
-
- **Deep learning**
- **Predictive behavior**
- **Digital assistance**
-
- **Virtual Observatory**
- **....**

REAL TIME

Dynamics

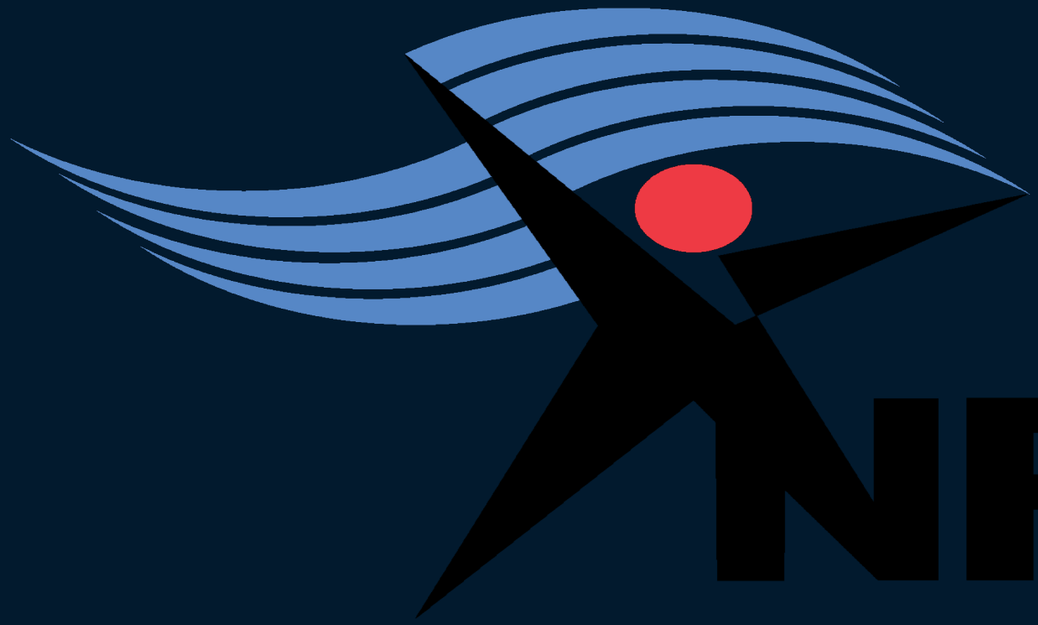
Adaptable

What Links Information Together?

What traces one piece of information *(design documents, logs, tickets, procedures,*

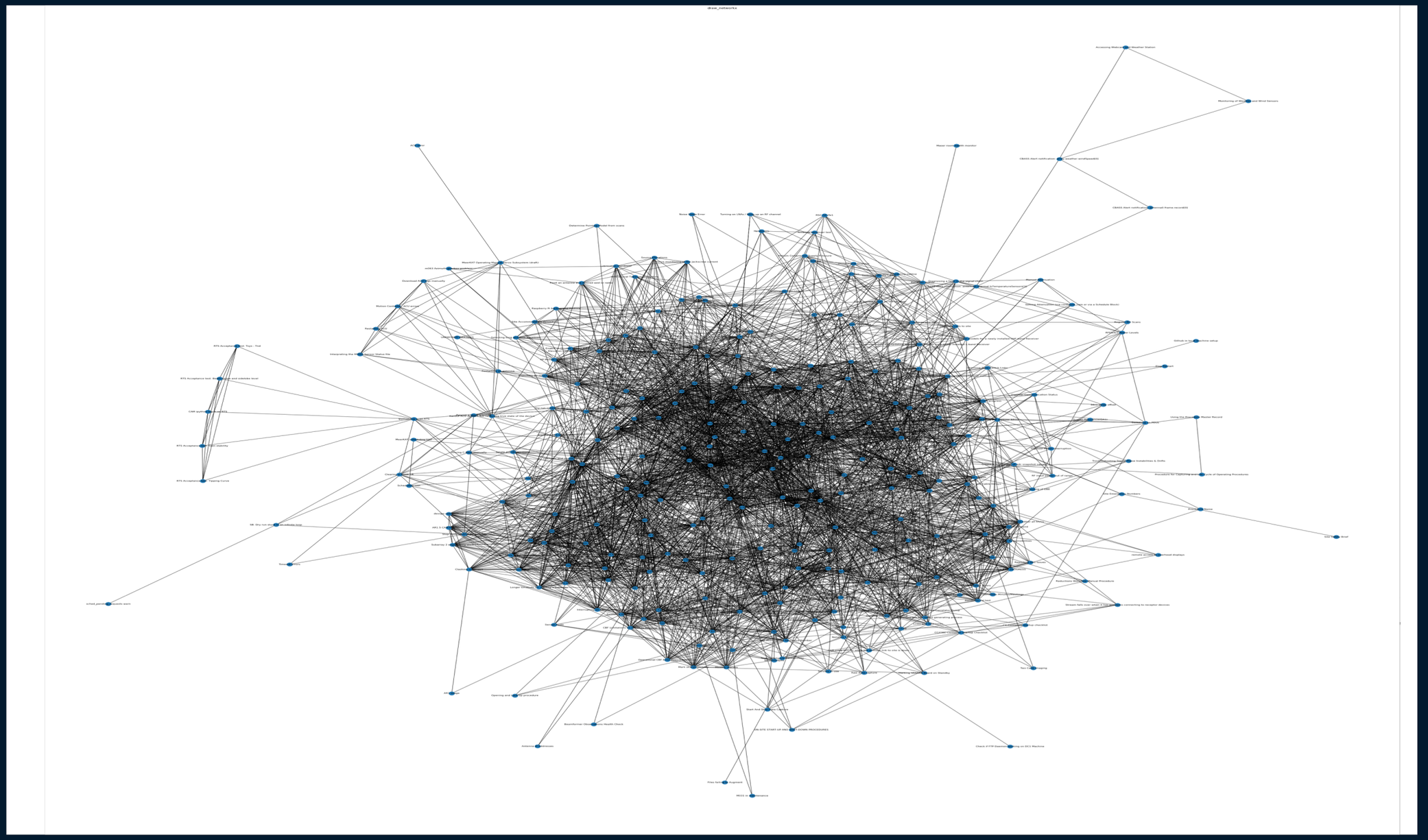
Examples

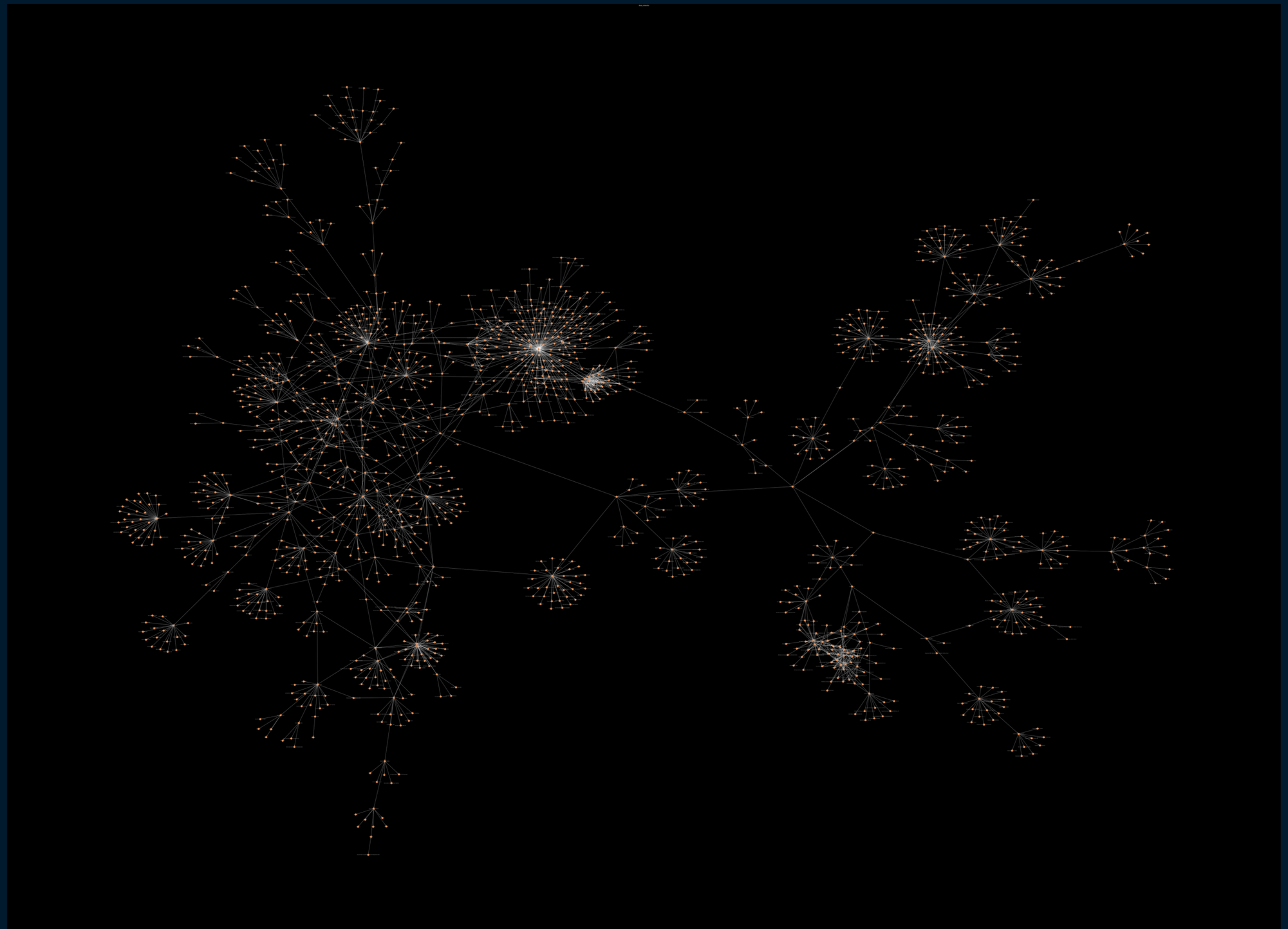
- RFI frequency
  - Observation Archive
  - Realtime signal
  - RFI monitoring
  - Component properties
  - Equipment Permit
  - Satellite
  - Aircraft
- Location
  - Contractor work
  - Equipment Permit
  - Maintenance JobCard
  - Security Access
  - Health & Safety checks
  - Visitor Access
- Sensor :
  - m057.ap.azim-enc-failed
  - ... in a bit more details



NRF | National Research Foundation

Design by Mind-map vs reality





What Links Information Together?

Traceability

ATNF visit 2017

PRESENTER: **Rupert Spann**

SKA South Africa, a Business Unit of the National Research Foundation.
We are building the Square Kilometre Array radio telescope (SKA), located in South Africa and eight other African countries, with part in Australia. The SKA will be the largest radio telescope ever built and will produce science that changes our understanding of the universe

Contact information

Rupert Spann
Manager: Operations Development
Email: rupert.spann@ska.ac.za