



Mobile Data Collection Applications

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Planned Burn Aerial Ignition

- Application brief
 - Develop a mobile application that can be used by Incendiary Operations Supervisors (IOS) and Bombardiers to assist aerial ignition operations
- Product requirements
 - Interactive map that overlays aircraft position against ignition map
 - Ability to track progress of ignition operations
 - Ability to record observations and share in real time with Burn Controllers and teams.
 - Automation of data management where possible.

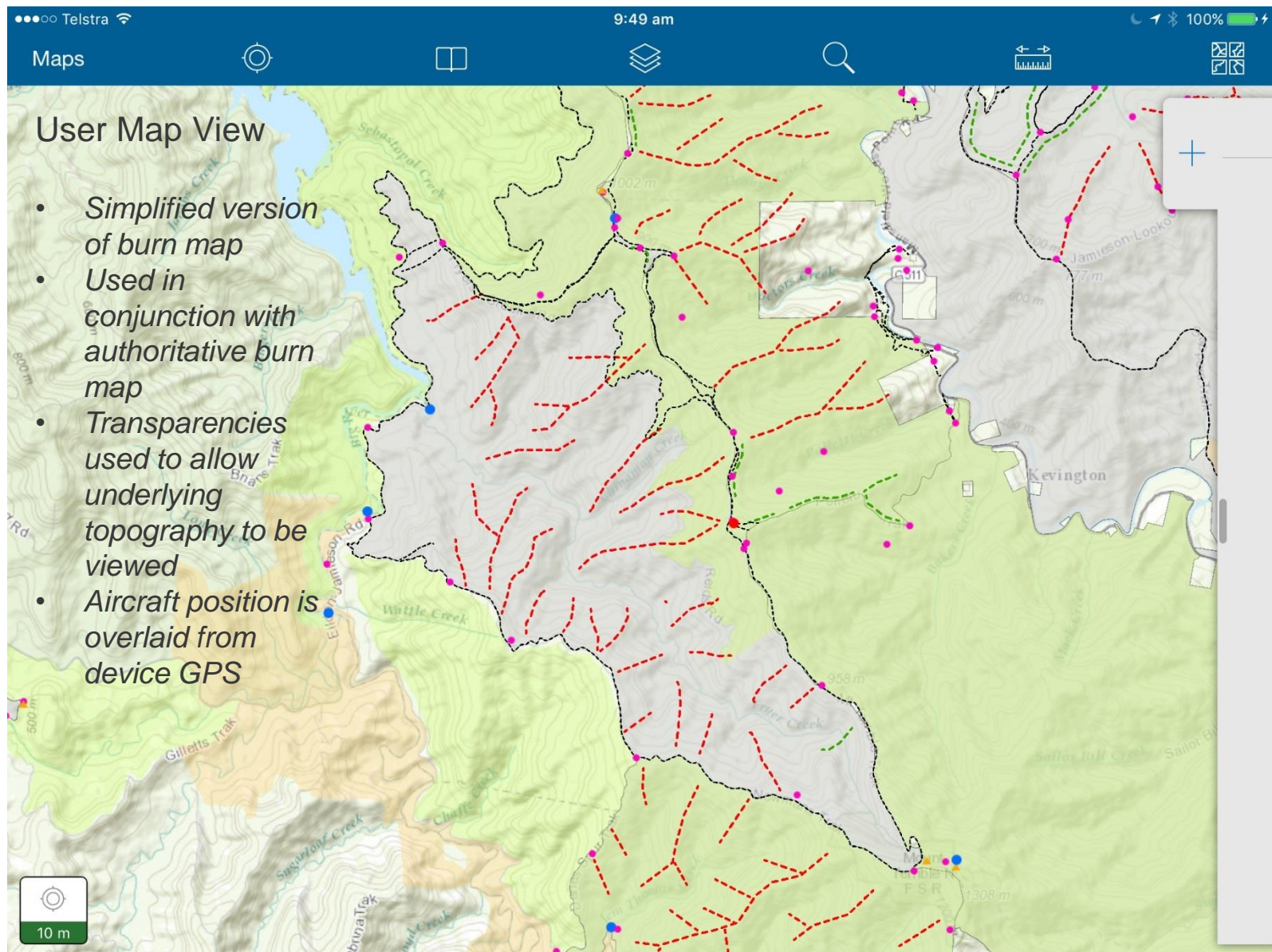
Planned Burn Aerial Ignition

- Design considerations
 - Where to source tactical data from?
 - How to collect observation data?
 - How to share observation data effectively?
 - How to manage network access and reception issues?

Planned Burn Aerial Ignition

- Design Solution
 - Mobile app designed using ArcGIS Collector
 - Tactical data sourced from Fireweb and incorporated into web service via ArcGIS
 - Web service regularly updated to AGOL using automated Python script
 - Observations collected in ArcGIS Collector and shared with Burn Controllers via custom web app
 - Observation spatial data scraped from AGOL via Python script and published to GISDesk for use in other software products.

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Feature Collection

- *Line features – ignition line and fire edge*
- *Point features – hot spots, spot overs and tree down*
- *Observations are drawn on map and automatically shared (subject to network connectivity)*

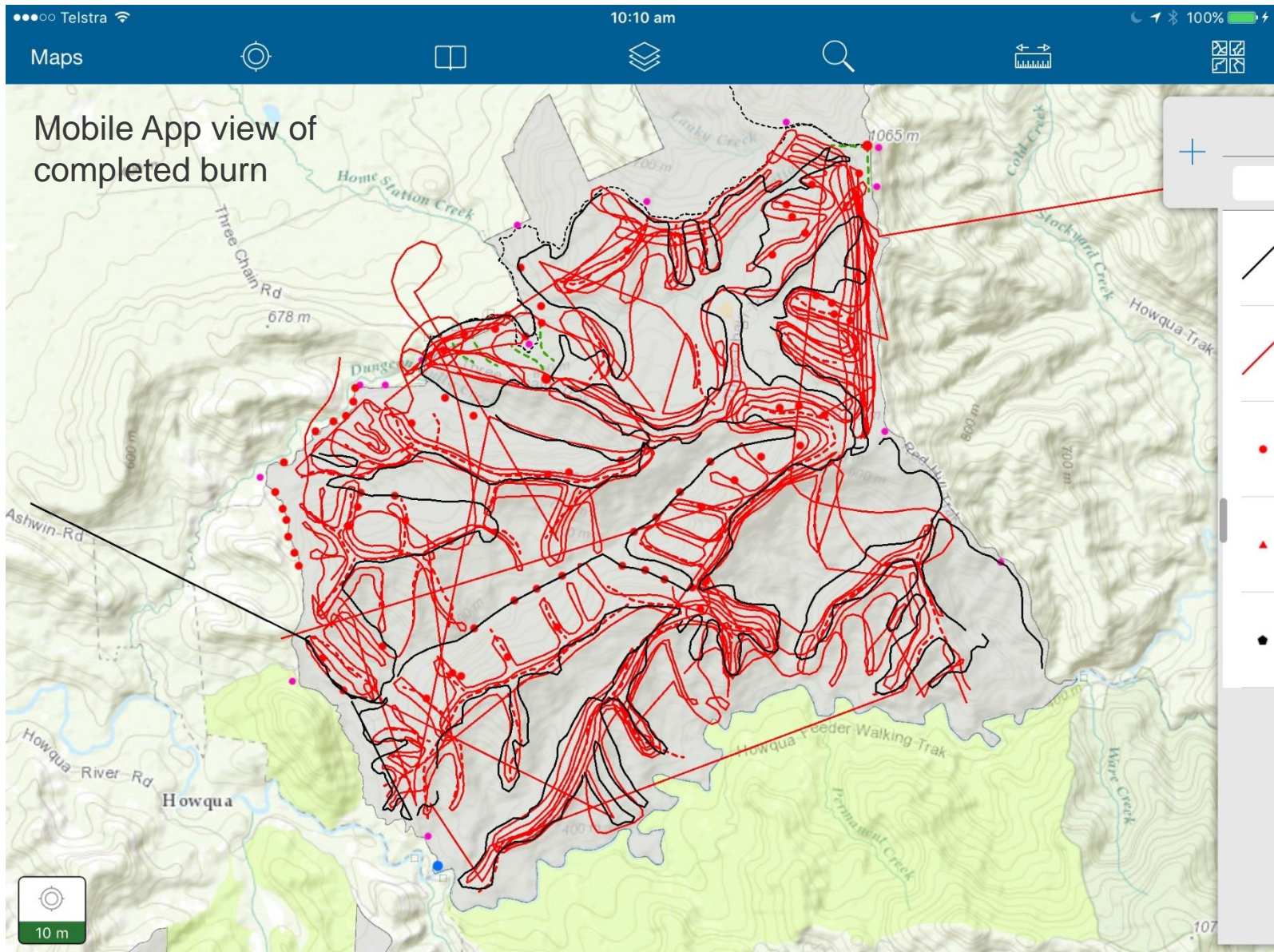
Collect a new feature

Filter

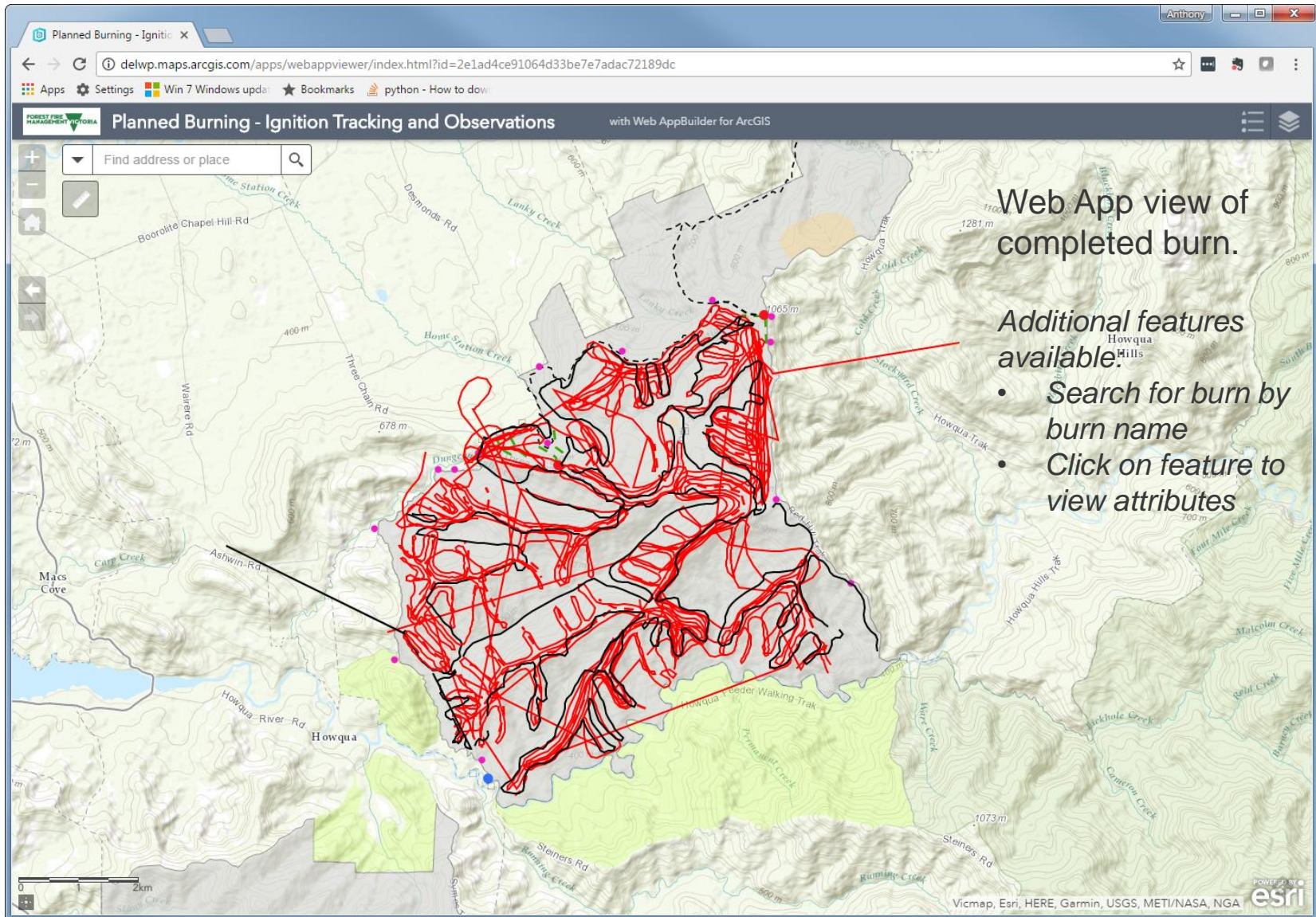
- Fire edge**
PRD_SERVICE_AIRIGNITION_DATACOLLECTI
ON - OBS LINE
- Ignition Line**
PRD_SERVICE_AIRIGNITION_DATACOLLECTI
ON - OBS LINE
- Hot spot within burn extent**
PRD_SERVICE_AIRIGNITION_DATACOLLECTI
ON - OBS POINT
- Fire activity outside burn extent**
PRD_SERVICE_AIRIGNITION_DATACOLLECTI
ON - OBS POINT
- Tree down over control line**
PRD_SERVICE_AIRIGNITION_DATACOLLECTI
ON - OBS POINT

10 m

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- Dealing with network connectivity
 - ArcGIS Collector allows for apps to be 'checked out' for working offline.
 - This allows a background map to be downloaded and cached, and generation of replica databases for any services used in the map.
 - Once an app is taken offline, data is no longer automatically synced with AGOL, and is reliant on the operator either manually forcing a sync when back in coverage, or the offline app being checked back in.
 - It is not possible to update map services (eg tactical features) if a copy is checked out to a user.

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- Dealing with network connectivity (continued)
 - Air ignition crews will often be deployed to multiple burns at a time, in geographically separate locations.
 - This will often not allow easy 'checking out' of projects as only a single area can be checked out at once. Trying to check out a contiguous area for all of the burns can be time, storage and data- intensive.
 - Solution is to run a number of 'duplicate' ArcGIS Collector projects that can each have a single area or burn checked out.

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- Feedback from users
 - Very easy to access app
 - Intuitive to use – using touchscreen swipe, pinch in, pinch out makes it very easy to navigate around
 - Very easy to record observations
 - Use of app on iPad rather than heavier option such as Tuffbook makes use functionally easier in aircraft.
 - iPad device availability means that use can be scaled up very quickly if need be, versus limited availability of specialised devices such as Tuffbooks.

Planned Burn Aerial Ignition

- Planned Improvements
 - Improvements to symbology – currently difficult to interpret some symbology
 - Improvements to 'fire edge' feature – either remove feature or change symbology 24 hours after observation
 - Improvements to 'ignition line' feature – change symbology after 24 hours (to account for multi day ignition plans)
 - Additional features to allow collection of 'crown scorch' and 'crown burn' areas

Planned Burn Aerial Ignition

- System / Infrastructure Issues
 - Native access to eMap tactical feature data would significantly simplify service publication process.
 - Vicmap API basemap is not able to be checked out for offline use. This means we are not using an authoritative base map (using ESRI basemap) which has known issues.
 - Vicmap API basemap does not include topography or relief at usable scales. This could be resolved through creation of a topography overlay service that could be overlaid on the Vicmap API where required.

Culvert Inspections (proof of concept)

- Application brief
 - Design a solution that allows simple recording of culvert inspections and works, to replace a current paper based system.
 - System needs to allow of verification and updating of key attributes (asset type, size, length etc) and also updating of spatial location where necessary.
 - System needs to allow for the capture of new features.
 - System also needs to log every inspection of an asset, as opposed to the last inspection of an asset.

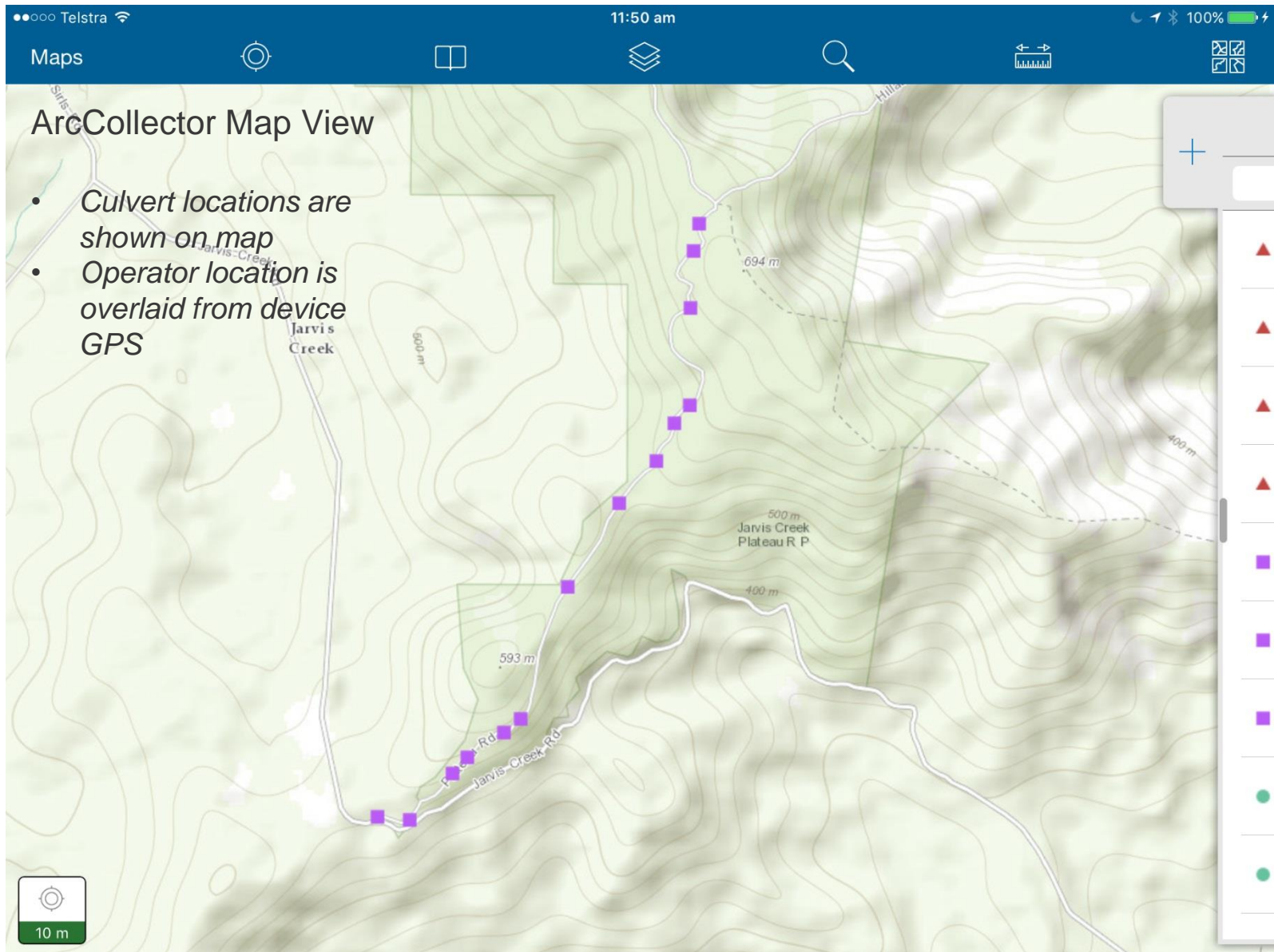
Culvert Inspections (proof of concept)

- Design solution
 - A blended solution of ArcGIS Collector and Survey123.
 - A Survey123 survey can be ‘automatically’ opened and survey answers pre-populated on a mobile device via a *http://* call.
 - *http://* call can be generated automatically based on Survey ID, attribute names and attribute values.

Culvert Inspections (proof of concept)

- Design implementation
 - Design an ArcGIS Collector app with point data showing location of assets.
 - Point data needs a field with unique http:// call for that record.
 - Operator uses ArcGIS Collector to navigate to and identify an asset, and to automatically open a S123 form for confirmation of asset attributes and collection of inspection data.
 - Automated process is run periodically to interrogate S123 and to update point source asset data. (To be developed).

Culvert Inspections (proof of concept)



Culvert Inspections (proof of concept)

ArcCollector Map View

- Operator selects the culvert that they wish to inspect
- S123 [http://](#) call is opened in feature pop-up
- Operator taps on [http://](#) call to automatically open S123 form.

Details



Location
Lat: -36.17698907° Long: 147.23238348°


Crossing Data


Survey 123 URL
[arcgis-survey123://?itemID=2e0d4d9bdfcc4f9f88ba3fd5725a1e91&field:CROSS_ID=X01327&field:TYPE_DESCRIPTION=c101&field:PIPE_LENGTH=8.0&field:CULVERT_CELLS=0&field:WATER_NAME=UNKNOWN&field:WATER_SOURCE=SW](#)

Culvert Inspections (proof of concept)

Collector 11:51 am 100%

 My Survey 


Asset Number *
NEW for unrecorded site
X01327 

Road Name *
UNKNOWN 

Asset Type *
☐ Bridge - Concrete
☐ Bridge - Concrete & Steel
☐ Bridge - Concrete & Timber
☐ Bridge - Concrete Steel & Timber
☐ Bridge - Log Earth Fill
☐ Bridge - Logfill
☐ Bridge - Steel
☐ Bridge - Timber
☐ Bridge - Timber & Steel
☐ Bridge - Unknown Type
☐ Cattle Grid
☐ Causeway
☐ Culvert - <300mm
☐ Culvert - 300mm
☒ Culvert - 350mm
☐ Culvert - 375mm
☐ Culvert - 400mm
☐ Culvert - 450mm

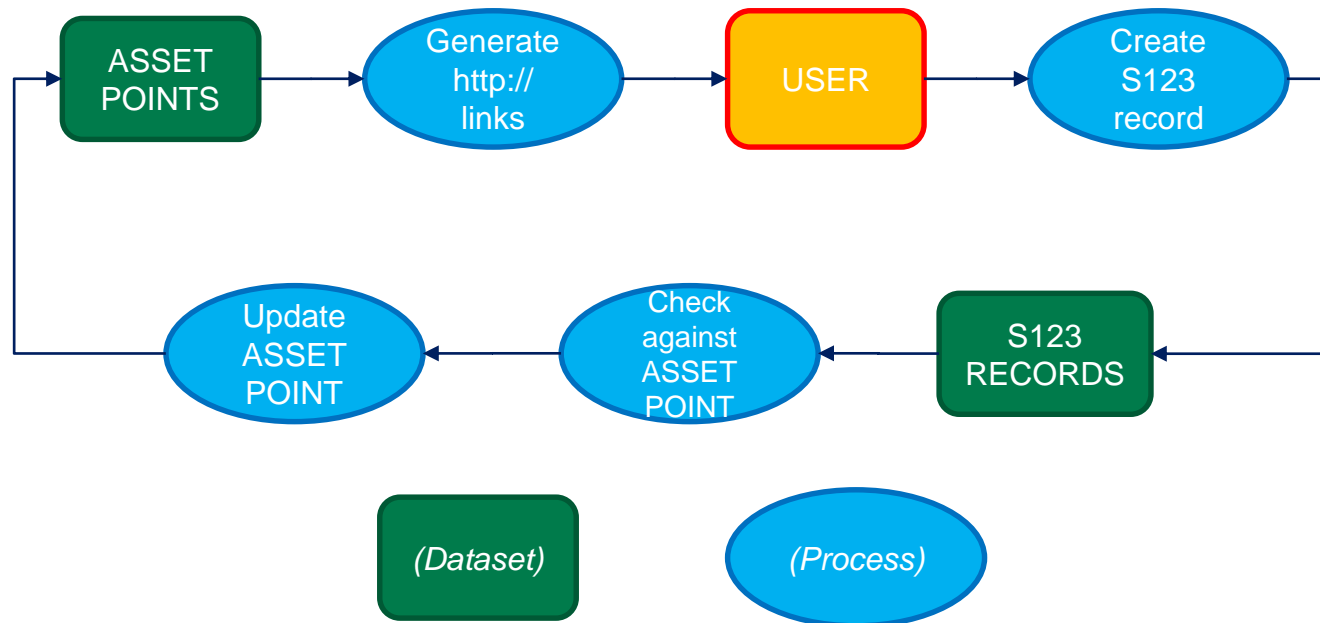
Survey123 Form View

- *Answers to survey questions are automatically populated based on content of http:// call*
- *Operator can modify pre-populated answers to update asset attributes*
- *Operator can capture new or missing attributes*



Culvert Inspections (proof of concept)

- Processing model





Site Safety Survey (work in progress)

- Project brief:
 - Develop an online survey in Survey123 that replicates existing site safety survey requirements.
- Application benefits:
 - Transition away from an existing paper-based system with variable record keeping to an electronic system.
 - Ability to create a spatial record of site / works locations.
 - Automated date / time stamping of record creation – will assist quality assurance and auditing of safety systems.
 - Ability to trigger various events based on SSS answers (for example: incident or near miss triggers an email notification to Works Coordinator).



Site Safety Survey (work in progress)

●●○○ Telstra 1:09 pm 100%

 Site Safety Survey 

Onsite supervisor is to facilitate completion of the Site Safety Survey (SSS) with workers. The SSS is to be completed each day before commencing the job **AND** if there are significant changes in conditions or environment.

Job: *

Date: *
26 May 2017  

Facilitated by: *

▼ **PART 1 - UNDERSTAND THE TASK**

Do you have a completed Job Safety Plan? **If YES**, go to next question. **If NO**, complete a Safe Work Method Statement (SWMS). *


☐ Yes
☐ No

Have all controls been implemented and checked as required? **If YES**, go to next question. **If NO**, implement controls and then go to next question. *

☐ Yes
☐ No

Have you discussed the job with your workers / team members and do they have a knowledge and understanding of the relevant SWPs and SOIs? **If YES**, go to **PART 2**. **If NO**, do not proceed until a job briefing or tool box meeting has occurred. Document details of the meeting / briefing then go to **PART 2**. *

☐ Yes
☐ No



Site Safety Survey (work in progress)

Site Safety Survey

Make sure the above information is communicated to all workers during the on-the-job briefing.

Sign off by onsite supervisor *

ANT ← *It is possible to collect signatures for additional validation*

Date and time *

26/5/17 1:07 pm

▼ PART 3 - IMMEDIATE POST-JOB SAFETY REVIEW

Did any incidents or near-misses occur? **If YES**, report to supervisor/manager as soon as possible, complete OHS incident card (if required) and record on POSSUM. *

☐ Yes
☐ No

Were any risk controls ineffective and/or can the Safe Work Procedure/s be improved? **If YES**, inform your supervisor/manager. *

☐ Yes
☐ No

Does a SWMS need to be converted to a SWP? **If YES**, inform your supervisor/manager. *

☐ Yes
☐ No

Please list any other issues noted with this job.

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Project and data management considerations

- Interacting with services, collected data and other software applications.
 - Where possible we should be relying on automating processes for publication and updating of services, and harvesting of data, as this allows methodology to be reliable and repeatable.
 - Currently using *Python* and *arcrest* module to publish services and harvest collected data. While this is achievable for operators with an intermediate level of experience with Python, it will be out of reach for many people wishing to design or utilise field data collection apps.
 - Using AGOL as opposed to Portal can make interaction with data more complex, however AGOL provides portability and potentially reduces reliance on a DELWP network connection.

Project and data management considerations

- Backing up of collected field data.
 - Manual processes can be set up on a per-project basis, but there is no centralised backing up or archiving.
 - A move from AGOL to Portal would bring field collected data into the DELWP ecosystem, which would then provide backup, archiving and disaster recovery if needed.
- Management of data services
 - Publication of authoritative CSDL datasets and/or views to AGOL would allow users to access this data directly for their apps. This would eliminate the need to users to generate and publish their own static cuts / views of CSDL data.

Project and data management considerations

- Ongoing management of apps and field data
 - Regional GIS has mature and documented data classification & management protocols.
 - These protocols guide how to classify spatial data (project, business or corporate), where this data should be stored / published, and how data should be documented.
 - These protocols may be adaptable to our use of AGOL.