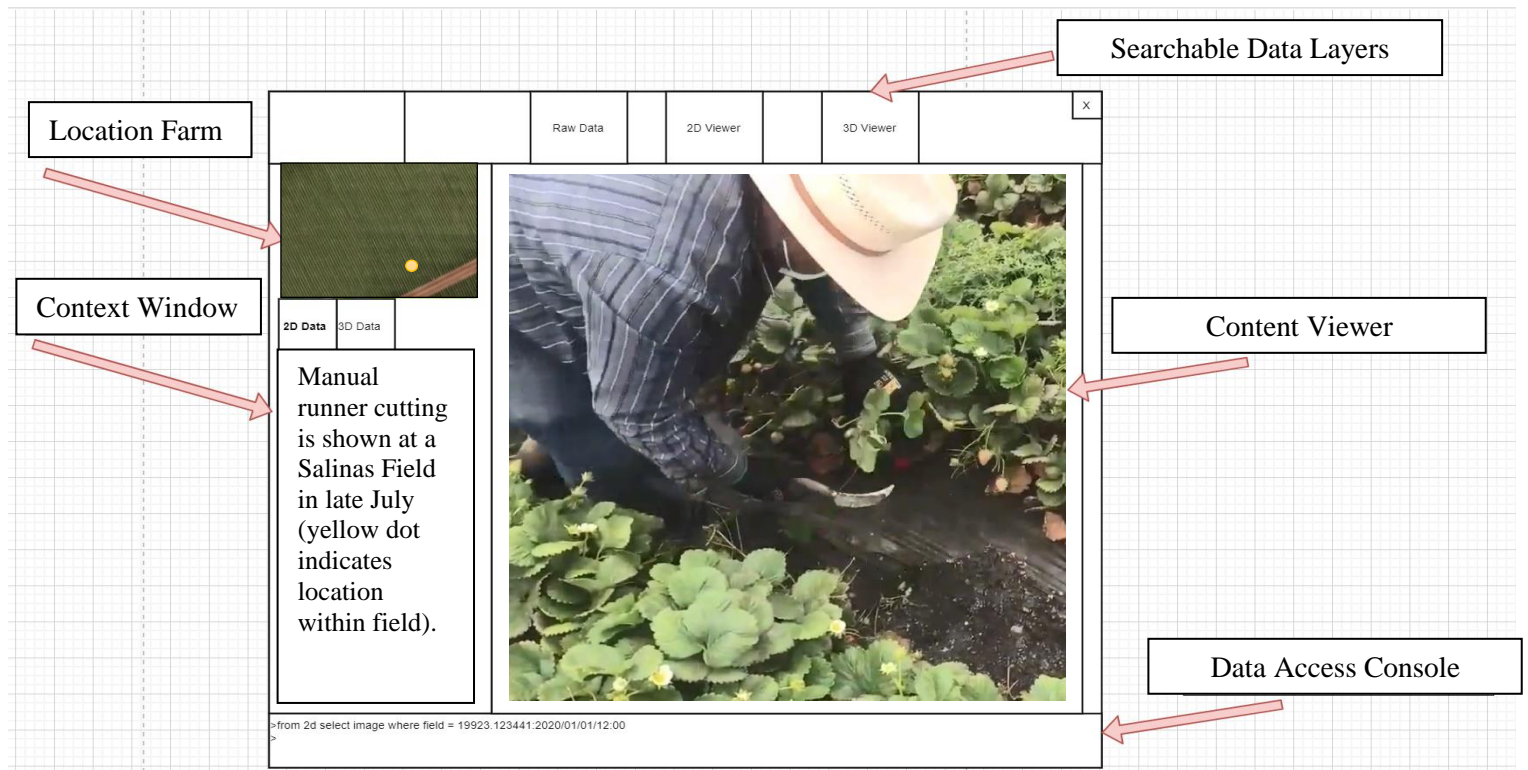


# Field 4D – Promoting Runner Cutter Automation

Robotic runner cutting solutions must work side-by-side with existing farm labor and field infrastructure. Minimal, low-cost field changes can be considered, but robotic solutions should avoid costly changes as much as possible to promote rapid adoption. The goal of this project is to promote runner cutter automation by providing a database of runner-related videos, images, and point clouds gathered from regular scanning of fruiting fields throughout the year. This “4D” characterization of the runner cutter problem should help private-sector robotics developers gain a deeper and more comprehensive understanding of field operations and needs.

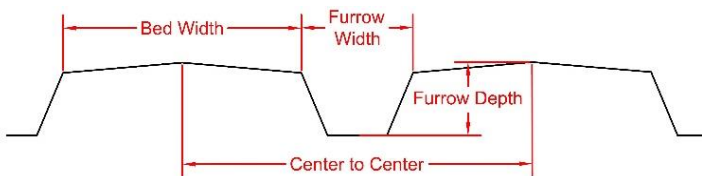
## Example use case:

Berry Machine Corporation (BMC – a fictional company) is considering developing a runner cutting robot for California strawberry farms but is based in Cambridge, Massachusetts, and has no experience working with California strawberries. The head of R&D finds our database and is able to view video of the current manual runner cutting practice (see figure 1).



**Figure 1.** An example of a searchable database of runner cutting related practices and infrastructure.

BMC decides it will invest in an autonomous runner cutter project but needs to know common strawberry bed profiles to fit its system to. The company searches our database and finds detailed bed dimensions depending on growing district (see figure 2).



Dimension	Max	Min	Ave
Center to Center (in)	65.70	62.96	63.99
Bed Width (in)	43.34	39.37	41.07
Furrow Width (in)	26.69	20.37	22.92
Furrow Depth (in)	19.56	0.72	13.83

**Figure 2.** Example output for a Santa Maria bed profile query.

BMC now needs precise plant spacing and plant architecture to see if its existing robots have the precision required to cut runners. The R&D department searches our database and finds plant counts, centers, and diameters labeled by growing district and calendar month. In addition, they find images of plant varieties with runners labeled (see Fig. 3).



**Figure 3.** Image of plant on left and labeled runners on right.

Finally, after a hard six months of research and development, the BMC California division deploys a state-of-the-art robotic runner cutter to a farm in Salinas. The system can autonomously enter and exit the field without tearing surrounding plastic mulch, and runners are being precision-trimmed without damage to plant architecture.