



CAST Issue Paper 70

Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges

Released November 16, 2020

Chair: Santosh Pitla, University of Nebraska-Lincoln;
21-member task force

Release/Rollout

The CAST Issue Paper, “Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges,” was released on November 16, 2020 On November 17. Task force chair, Dr. Santosh Pitla presented highlights of the paper followed by a Q&A session with a panel of five authors—Dennis Buckmaster, Tami Brown-Brandl, Todd Janzen, Michael Sama, and Scott Shearer. There were 604 registrants for the webinar and 319 unique viewers attending on Zoom.

- [Webinar Video](#)– 376 views as of December 13, 2022
- [Link to commentary, Ag quickCAST, student study guide, webinar video, and Q&A.](#)

In-kind Contributions: 270 volunteer hours; \$19,980 monetary value

Press Release (results two weeks after release)

- Distributed through [Constant Contact](#), [PRWeb](#), and the [CAST website](#).
- Press release went to 10,169 e-contacts resulting in 4,723 opens
- 105 views of the press release from the CAST website as of May 16, 2021.
- The press release through PRWeb resulted in 3,058 views and reached 975 targeted influencers (journalists/bloggers).
- 98 media outlets posted the press release. A sampling of sites where the press release was picked up: [AgriMarketing](#), [AgriTech Tomorrow](#), [Madri+d Blogs](#), GrowingGeorgia – [Georgia](#) AgriBusiness Council, [GPS Daily](#), [Feedstuffs](#), [ADVN Financial News](#), [Seed Daily](#), [Ten15AM](#), [News Break](#), [Knowledia](#), [RoboDaily](#), RFD-TV, News Break, NAAE Communities of Practice, One News Page (U.S. and Global Editions), Ask.com, Seed Daily, and many daily news and business journal sites, and regional news channels (ABC, CBS, CW, FOX, NBC).

Follow-On Activities

American Society of Agronomy/Soil Science Society of America, 1 CEU for professional development was offered to certified crop advisors for watching the webinar.

National Association of Agricultural Educators, Communities of Practice – blog posts in “online/distance learning resources’ including a summary of the publication, Ag quickCAST, and student study guide attachment (82 views)

Paper Distribution

Paper Distribution (print and online access from CAST website) 6 months after release –2,529

Indirect Paper Distribution

AgriTech Tomorrow, White Papers

<https://www.agritechtomorrow.com/whitepapers.php>

Ministry of Science and Technology (Taiwan)

<https://outlook.stpi.narl.org.tw>

University of Nebraska-Lincoln, DigitalCommons@University of Nebraska

<https://digitalcommons.unl.edu/biosysengfacpub/727/>

<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1732&context=biosysengfacpub>

ResearchGate,

https://www.researchgate.net/publication/346023818_Ground_and_Aerial_Robots_for_Agricultural_Production_Opportunities_and_Challenges

Semantic Scholar,

<https://www.semanticscholar.org/paper/Ground-and-Aerial-Robots-for-Agricultural-and-Pitla-Brown-Brandl/aca874127e13a20f14f71de18f99f6b99ca9d15>

Articles and Web Mentions

AgriNews, *Machines of the future: Robots give farmers a helping hand*, Martha Blum, December 18, 2020

<https://www.agrinews-pubs.com/news/farm-equipment/2020/12/18/machines-of-the-future-robots-give-farmers-a-helping-hand/>

FarmWeek e-Edition, *Can robots solve agricultural workforce availability issues?* P. 11, Daniel Grant, November 23, 2020

https://www.farmweeknow.com/eedition/page-a11/page_cc99931d-5bda-5a82-b97e-3651647903a0.html

https://www.farmweeknow.com/profitability/can-robots-solve-agricultural-workforce-availability-issues/article_3bb62b2e-29d0-11eb-940d-23c0f7817d49.html

Wallaces Farmer, *How soon will robotic agriculture take root?* January 21, 2021,

<https://www.farmprogress.com/technology/how-soon-will-robotic-agriculture-take-root>

GrainNet, *Robots in Agriculture: Council for Agricultural Science and Technology Outlines Opportunities, Challenges*, November 20, 2020

<https://www.grainnet.com/article/217978/robots-in-agriculture-cast-outlines-opportunities-challenges>

GPS Daily, *CAST releases paper on “Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges”*, November 17, 2020

https://www.gpsdaily.com/reports/CAST_releases_paper_on_Ground_and_Aerial_Robots_for_Agricultural_Production_Opportunities_and_Challenges_999.html

Janzen Ag Law, *Janzen Speaks at CAST Webinar: Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges*,
<https://www.aglaw.us/events/2020/11/17/janzen-speaks-at-cast-webinar-ground-and-aerial-robots-for-agricultural-production-opportunities-and-challenges>

Janzen Ag Law, *High in the Sky, Low on the Ground: Janzen Part of CAST Paper on Robots in Ag*, November 16, 2020, Kenda Resler Friend,
<https://www.aglaw.us/news/2020/10/23/janzen-shares-perspective-in-cast-paper-on-robots-in-ag>

National Grain and Feed, *Robots in agriculture: CAST outlines opportunities and challenges*, Sarah Gonzalez, November 20, 2020 Newsletter
<https://www.ngfa.org/newsletter/robots-in-agriculture-cast-outlines-opportunities-and-challenges/>

Ohio Field Leader, 2021, *Future Agricultural Technology*,
<http://www.ohiofieldleader.com/research/future-agricultural-technology/>

Purdue University, ABE News, December 2020
<https://engineering.purdue.edu/ABE/aboutus/Newsletter/December2020ABeNotes>

Texas Farm Bureau, Texas Agriculture Daily, *Challenges, opportunities to adopting robots in ag*, Jennifer Dorsett, December 9, 2020 (with link to paper)
<https://texasfarmbureau.org/challenges-opportunities-to-adopting-robots-in-agriculture/>

Upstream Ag Insights, *Upstream Ag Insights Vol2 – Jan 24th*, January 24, 2021,
<https://upstreamaginsights.substack.com/p/upstream-ag-insights-vol2-jan-24th>

WattPoultry.com, *Robots bring poultry industry closer to connected farms*, Elizabeth Doughman, November 18, 2020,
<https://www.wattagnet.com/articles/41573-robots-bring-poultry-industry-closer-to-connected-farms?v=preview>

Citations

Commentary *Opportunities for Robotic Systems and Automation in Cotton Production*, **AgriEngineering (MDPI)**, May 28, 2021, <file:///C:/Users/Student2/Downloads/agriengineering-03-00023-v2.pdf>

Article *A Range-Based Algorithm for Autonomous Navigation of an Aerial Drone to Approach and Follow a Herd of Cattle*, **Sensors (MDPI)**, October 29, 2021, <file:///C:/Users/Student2/Downloads/sensors-21-07218-v2.pdf>

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<https://access.onlinelibrary.wiley.com/doi/full/10.1002/agj2.20749>
Emerging Precision Management Methods in Poultry Sector, **MDPI Agriculture**, May 18, 2022,
<https://www.mdpi.com/2077-0472/12/5/718>

Planning Algorithms for Robots Operating in Vineyards, Thayer, Thomas C. University of California, Merced, **ProQuest Dissertations Publishing**, 2021. 28650118.
<https://www.proquest.com/openview/953289c4392bfd17944a687b392c8d6a/1?pq-origsite=gscholar&cbl=18750&diss=y>

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Conferences, *mmWave on a Farm: Channel Modeling for Wireless Agricultural Networks at Broadband Millimeter-Wave Frequency*, **2022 19th Annual IEEE International Conference on Sensing, Communication and Networking, (SECON)**, September 2022 <https://ieeexplore.ieee.org/abstract/document/9918595>

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Social Media

Twitter—

@JanzenLaw, November 16, 2020

<https://twitter.com/JanzenLaw/status/1328408607310958593>

1 retweet, 3 likes

@AgriTechTmrw, November 16, 2020

<https://twitter.com/AgriTechTmrw/status/1328383140524666881>

1 like

@GregDahl8, November 17, 2020

<https://twitter.com/GregDahl8/status/1328782589608529922>

1 retweet, 3 likes

@FutureOfAg, November 17, 2020

<https://twitter.com/FutureOfAg/status/1328623734467465216>

@MichaelKirkby, November 17, 2020

<https://twitter.com/MichaelKirkby/status/1328807910558867458>

@CASTagScience, November 19, 2020

<https://twitter.com/CASTagScience/status/1329436811584827393>

3 retweets, 3 likes

@UNL_IANR, December 8, 2020

https://twitter.com/UNL_IANR/status/1336325374423126016

1 retweet, 4 likes

@Syed_Meesam_Ali, December 9, 2020

https://twitter.com/Syed_Meesam_Ali/status/1336868098020937734

@CASTagScience, January 27, 2021

<https://twitter.com/CASTagScience/status/1354497026071928836>

2 retweets, 4 likes

@CASTagScience, April 8, 2021

<https://twitter.com/CASTagScience/status/1380194594982408200>

3 retweets, 4 likes

Facebook—

CAST, November 4, 2020

<https://www.facebook.com/CASTagScience/photos/a.477568575671277/3512927228802048>

3 likes, 1 share

CAST, November 12, 2020

<https://www.facebook.com/CASTagScience/photos/a.477568575671277/3535452033216234>

CAST, November 16, 2020

<https://www.facebook.com/CASTagScience/videos/691977461688726>

2 likes, 6 shares

CAST, November 17, 2020

<https://www.facebook.com/CASTagScience/photos/a.477568575671277/3549530668475037>

1 share

CAST, November 19, 2020

<https://www.facebook.com/CASTagScience/photos/a.477568575671277/3555119647916139>

2 likes

CAST, December 15, 2020

<https://www.facebook.com/CASTagScience/posts/3624170384344398>

2 likes, 1 share

CAST, January 27, 2021

<https://www.facebook.com/CASTagScience/posts/3735004869927615>

1 like

LinkedIn—

CAST, November 4, 2020

<https://www.linkedin.com/feed/update/urn:li:activity:6729767924426391552>

9 likes

CAST, November 12, 2020

<https://www.linkedin.com/feed/update/urn:li:activity:6732668676568322048>

5 likes

CAST, November 16, 2020

<https://www.linkedin.com/feed/update/urn:li:ugcPost:6734114090660192256>

CAST, November 17, 2020

<https://www.linkedin.com/feed/update/urn:li:activity:6734472689592889344>

1 like

CAST, November 19, 2020

<https://www.linkedin.com/feed/update/urn:li:activity:6735202478129721345>

1 like

Blog—

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