

Supplementary Material

Appendix 1 - Questionnaire for participants and stakeholders.

List of 34 questions, 10 of which were closed-ended, distributed to all webinar participants and further disseminated through an online communication campaign conducted via Italian forestry-related Internet channels, in order to reach additional stakeholders who had not attended the event but were interested in the topic

INTRODUCTORY INFORMATION

1. Which type of organization or institution do you belong to?
2. In which Italian region(s) does your organization mainly operate?
3. How many employees or collaborators does your organization have?
4. What are the main activities you perform in the forest sector?
5. For how many years has your organization been operating in the forest sector?
6. What amount has your organization invested in digital tools and technologies over the last 5 years?
7. Does your organization plan to invest or increase investments in precision technologies in the coming years?

GIS & DSS for silviculture

8. What is your level of knowledge/use of the following tools?
 - a. GIS software
 - b. Decision Support Systems (DSS)(1 = Not aware; 2 = Aware but not interested in using it; 3 = Aware but unable to use it without training; 4 = Use occasionally; 5 = Use regularly)
9. How useful would specific training be for using the following tools?
 - a. GIS software
 - b. DSS
 - c. Collaborative GIS platforms(1 = Not at all; 5 = Completely)
10. In which time horizon do you consider it feasible to invest in the adoption of these digital technologies?
11. What level of financial investment would your organization be willing to allocate to these digital technologies?
12. What level of financial investment would you be willing to allocate to train an operator in the use of these digital technologies?

REMOTE AND PROXIMAL SENSING

13. What is your level of knowledge/use of the following technologies?

- a. Aerial drones
- b. Aquatic drones
- c. Photogrammetry software
- d. Geoprocessing software
- e. TLS technology
- f. LiDAR processing software
- g. GNSS technology
- h. ML and AI procedures

(1 = Not aware; 2 = Aware but not interested in using it; 3 = Aware but unable to use it without training; 4 = Use occasionally; 5 = Use regularly)

14. How useful would specific training be for using the following technologies?

- a. Aerial drones
- b. Aquatic drones
- c. Photogrammetry software
- d. Geoprocessing software
- e. TLS technology
- f. LiDAR processing software
- g. GNSS technology
- h. ML and AI procedures

(1 = Not at all; 5 = Completely)

15. In which time horizon do you consider it feasible to invest in the adoption of these digital technologies?

16. What level of financial investment would your organization be willing to allocate to these digital technologies?

17. What level of financial investment would you be willing to allocate to train an operator in the use of these digital technologies?

ICT FOR URBAN FORESTRY

18. What is your level of knowledge/use of the following tools?

- a. Resistograph / dendrodensimeter
- b. Sonic tomography
- c. Static pulling tests
- d. Urban tree inventories
- e. Tree stability assessment techniques
- f. Urban tree management software

(1 = Not aware; 2 = Aware but not interested in using it; 3 = Aware but unable to use it without training; 4 = Use occasionally; 5 = Use regularly)

19. How useful would specific training be for using the following tools?

- a. Resistograph / dendrodensimeter
- b. Sonic tomography
- c. Static pulling tests
- d. Urban tree inventories
- e. Tree stability assessment techniques
- f. Urban tree management software

(1 = Not at all; 5 = Completely)

20. In which time horizon do you consider it feasible to invest in the adoption of these digital technologies?

21. What level of financial investment would your organization be willing to allocate to these digital technologies?

22. What level of financial investment would you be willing to allocate to train an operator in the use of these digital technologies?

PRECISION HARVESTING

23. What is your level of knowledge/use of the following technologies?

- a. ICT in forest operations
- b. Forest operation planning software
- c. Machine sensor systems
- d. Environmental impact reduction technologies
- e. Operator health, safety and wellbeing technologies
- f. Cybersecurity
- g. Cybersafety (digital operational safety)

(1 = Not aware; 2 = Aware but not interested in using it; 3 = Aware but unable to use it without training; 4 = Use occasionally; 5 = Use regularly)

24. How useful would specific training be for using the following technologies?

- a. ICT in forest operations
- b. Forest operation planning software
- c. Machine sensor systems
- d. Environmental impact reduction technologies
- e. Operator health, safety and wellbeing technologies
- f. Cybersecurity
- g. Cybersafety (digital operational safety)

(1 = Not at all; 5 = Completely)

25. In which time horizon do you consider it feasible to invest in the adoption of these digital technologies?

26. What level of financial investment would your organization be willing to allocate to these digital technologies?

27. What level of financial investment would you be willing to allocate to train an operator in the use of these digital technologies?

PRODUCT CERTIFICATION AND TRACEABILITY

28. What is your level of knowledge/use of the following systems?

- a. Traceability systems
- b. ERP systems for centralized management
- c. CRM systems for customer management
- d. Paperless documentation systems
- e. Online training

(1 = Not aware; 2 = Aware but not interested in using it; 3 = Aware but unable to use it without training; 4 = Use occasionally; 5 = Use regularly)

29. How useful would specific training be for using the following systems?

- a. Traceability systems
- b. ERP systems for centralized management
- c. CRM systems for customer management
- d. Paperless documentation systems
- e. Online training

(1 = Not at all; 5 = Completely)

30. In which time horizon do you consider it feasible to invest in the adoption of these digital technologies?

31. What level of financial investment would your organization be willing to allocate to these digital technologies?

32. What level of financial investment would you be willing to allocate to train an operator in the use of these digital technologies?

CROSS-CUTTING QUESTIONS

33. What do you consider to be the main challenges or barriers to the implementation of digital technologies in the forest sector?

34. Which tools or support measures would facilitate the adoption of new digital technologies in your activity or organization?

Fig. S1 - Knowledge and use of remote sensing technologies.

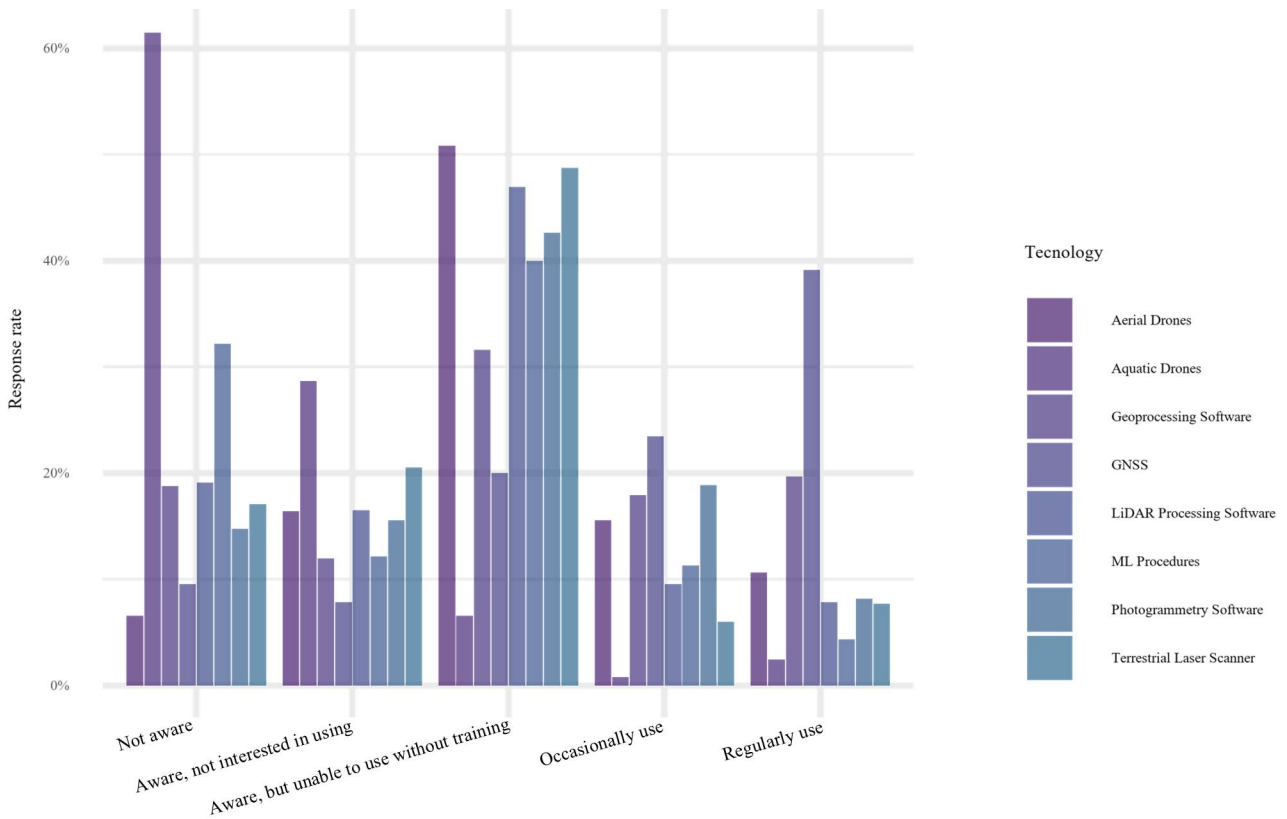


Fig. S2 - Knowledge and use of GIS/DSS technologies.

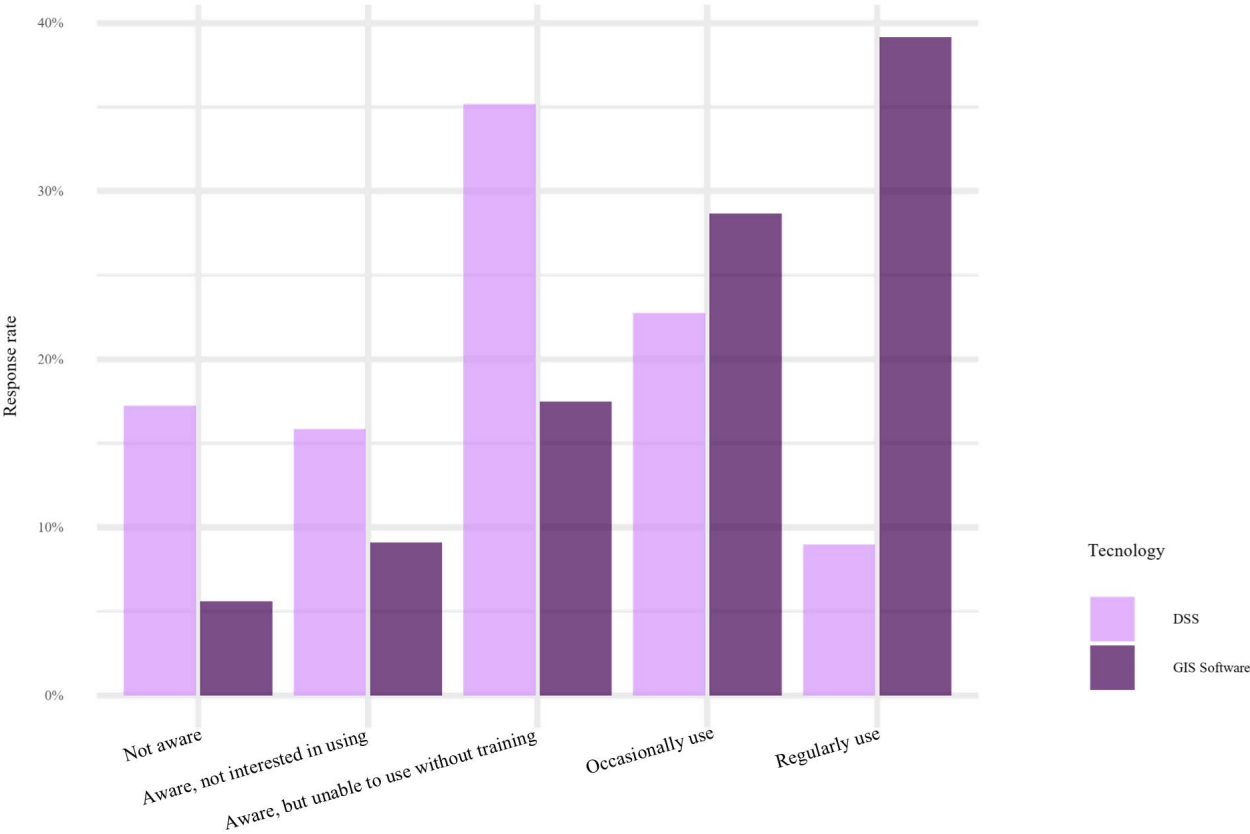


Fig. S3 - Knowledge and use of ICT tools for urban forestry.

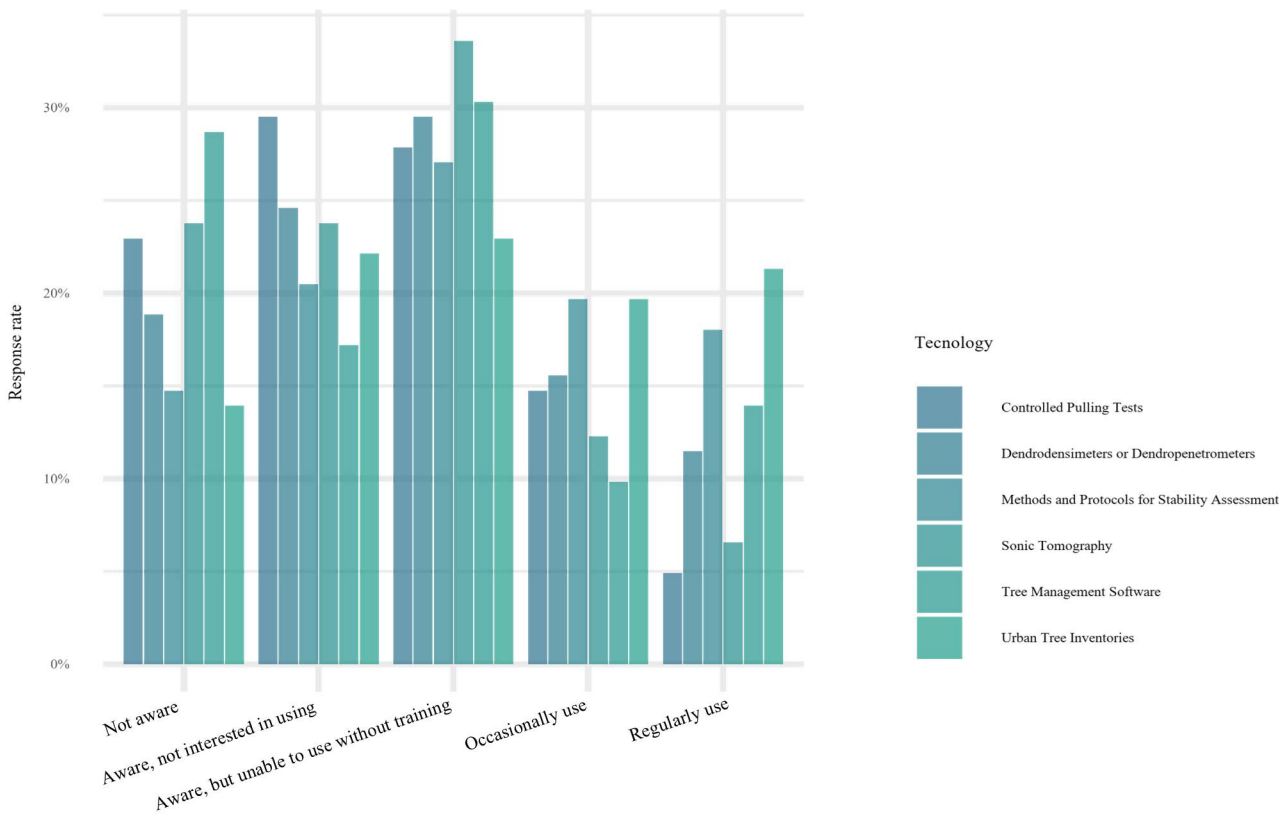


Fig. S4 - Knowledge and use of precision harvesting tools.

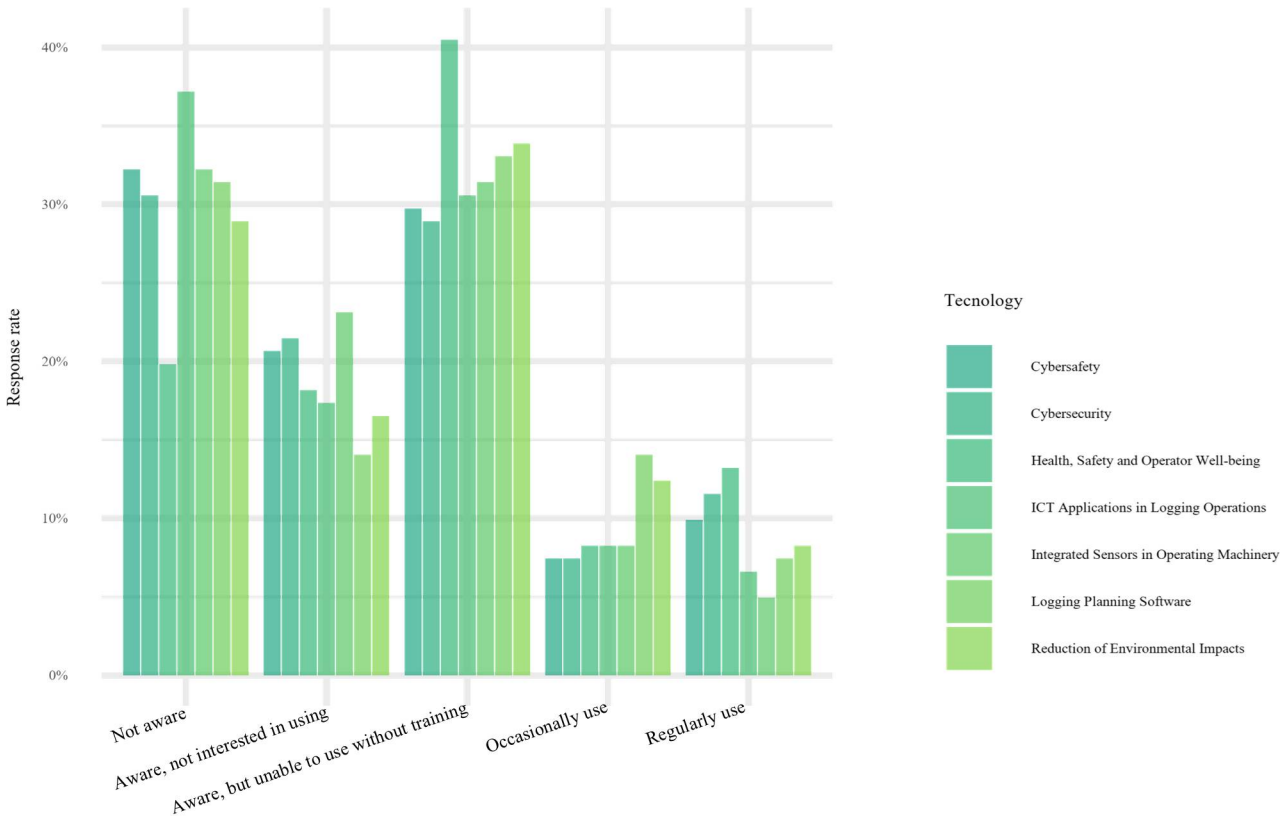


Fig. S5 - Knowledge and use of ICT tools for forest product certification and traceability.

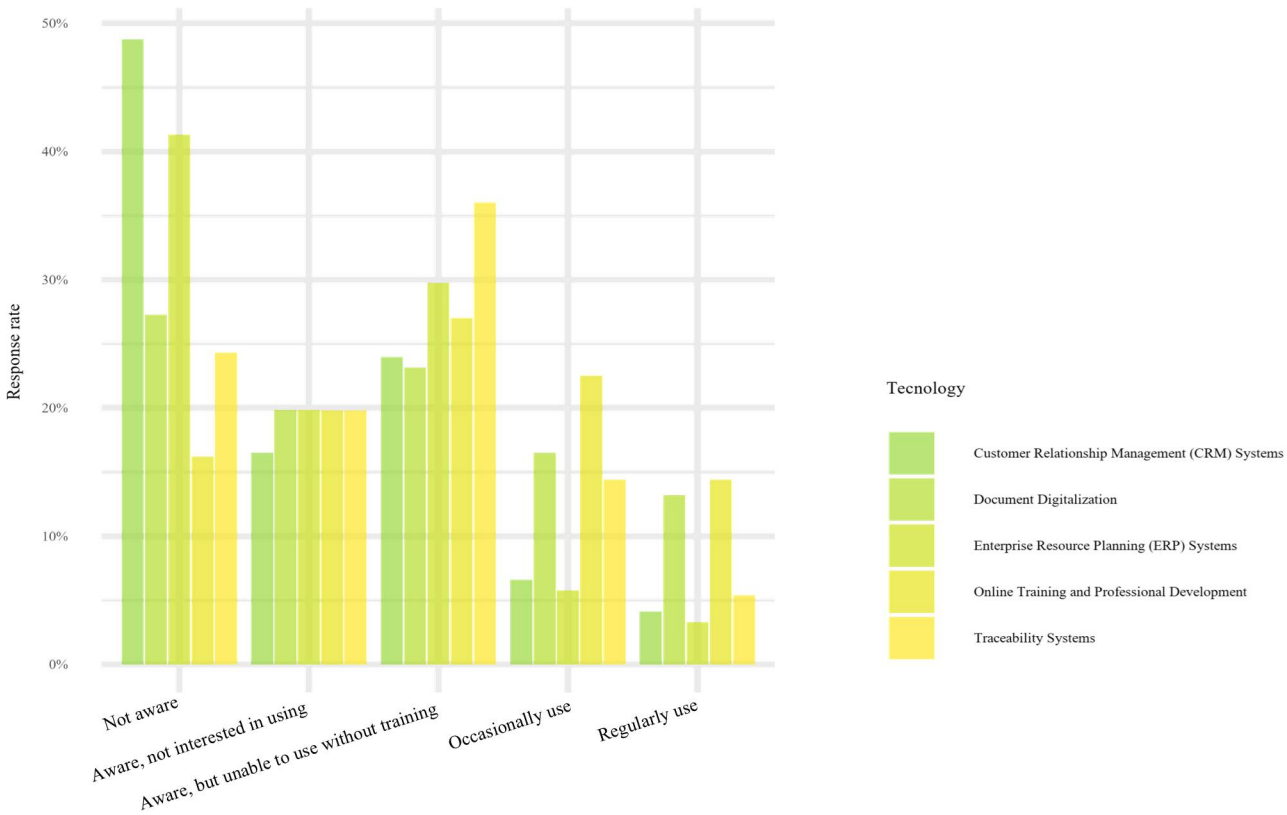
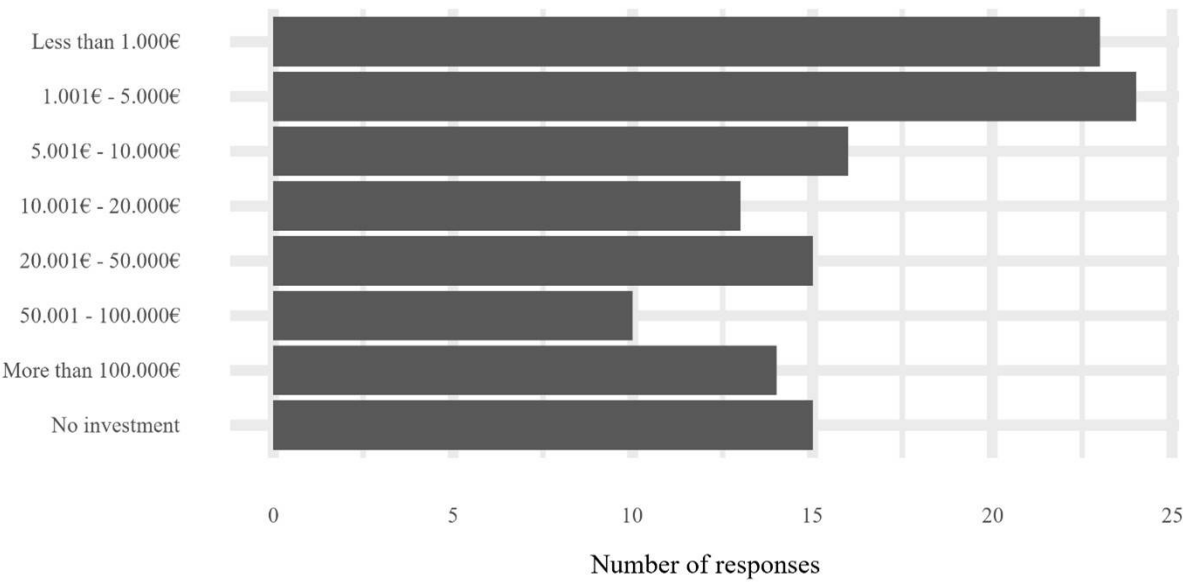


Fig. S6 - Investments in precision technologies over the past five years.



Missing responses: 37

Fig. S7 - Investment forecasts for precision technologies in the coming few years.

