



**MTT-S**

**IEEE Microwave Theory & Techniques Society**

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# Updated Strategic Long-Range Plan October 2020

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# OVERVIEW

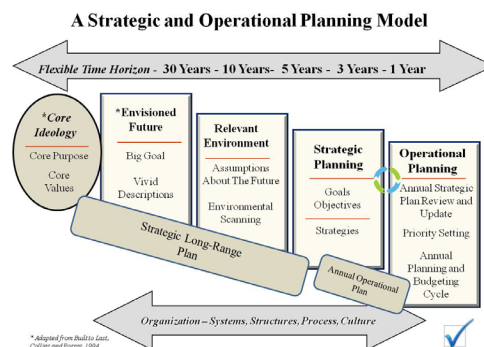
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The Microwave Theory and Techniques Societies (MTT-S) strategic long-range plan describes a desired vision and what will be essential to achieving that vision. It is grounded in *core ideology* and driven by an *envisioned future* that realizes the full potential of MTT-S’s ability to support its stakeholders and the industry. MTT-S’s commitments are articulated in *goals* that declare the outcomes or attributes the organization intends to achieve. *Objectives* represent key metrics affecting MTT-S’s ability to achieve the goal and articulate the direction in which these issues must be moved. *Strategies* will describe how MTT-S plans to commit its limited resources to make its vision a reality.

In the future, MTT-S will not be able to be all things to all people, but it must be different things to different people as the plan evolves to meet the needs of a constantly changing professional environment. Therefore, underlying this plan is the adoption of an ongoing process of planning and thinking strategically, designed to ensure relevance of direction and action over time.

In developing this strategic plan, a framework for planning was utilized, based on a model that organizes conversations about the future into four distinct planning “horizons.” Ideas for Action has found the use of this framework to be a powerful tool. It helps organizations in prioritizing and executing outcomes as well as in ensuring relevance of an organization’s long-range direction over time.



**Envisioned future.** The “four planning horizons” framework consists of crafting a comprehensive strategic direction based on the balance between what does not change--the timeless principles of the organization’s core purpose and core values (core ideology) -- and what the organization seeks to become within a 10- to 30-year horizon--what would be possible beyond the restraints of the current environment. The 10- to 30-year horizon is characterized by the articulation of an envisioned future--a BAG (big audacious goal)--and a vivid description--what it will be like to achieve the goal.

**Critical factors.** The articulation of the envisioned future guides the organization as it considers the factors that will affect its ability to achieve its goals. Building foresight about the 5- to 10-year horizon--assumptions, opportunities, and critical uncertainties in the likely

relevant future as well as emerging strategic mega-issues--suggests critical choices about the potential barriers the organization will face. This foresight also suggests the responses the organization will need to consider in navigating its way toward achievement of its 10- to 30-year goal, or BAG.

**Strategic plan and operational planning.** The linkage continues into the 3- to 5-year horizon through the development of a formal long-range strategic plan, in which the organization articulates the outcomes it seeks to achieve for its stakeholders. How will the world be different as a result of what the organization does? Who will benefit, and what will the likely results be? Further, the articulation of strategies will bring focus to MTT-S's annual operational allocation of discretionary resources. Action plans, checkpoints, and milestones will be developed through a process of operational planning, indicating MTT-S's progress toward each goal in every planning year.

A strategic long-range plan is not intended as a substitute for an annual program or operating plan. It does not detail all the initiatives, programs, and activities the organization will undertake in the course of serving its membership and the industry, nor can it foresee changes to the underlying assumptions on which key strategic choices were based. Instead, the strategic plan identifies what MTT-S is not doing today, but must be doing in the future to be successful. Consequently, the strategic plan implies change--doing new things or doing more or less of current activities to ensure successful outcomes.

**Ongoing Re-evaluation.** Strategic planning for MTT-S should become the methodology for the organization's operations. If it is successful, this process will not have yielded a plan to be placed on the shelf, but will have served as a catalyst for the "process of planning strategically," at all times and at all levels throughout the organization. In order to achieve its vision, MTT-S must not look at strategic long-range planning as a one-time project that produces a milestone document of its best thinking at the moment. Instead, MTT-S must adopt strategic planning as an operational philosophy of ongoing re-evaluation of the critical knowledge bases that form the framework of its world, including:

- Sensitivity to member needs, insight into the future environment of the industry,
- Understanding of the capacity and strategic position of the organization, and
- Effective analysis of the ethical implications of policy and program choices.

MTT-S's strategic long-range plan represents a compass the organization will use to guide its work over the next five years. Each year of its life, the plan will be updated based on experience or new circumstances or as new opportunities or challenges emerge. In 2025, MTT-S should author a new strategic long-range plan based upon the new environment expected to exist in a rapidly evolving world.

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## ~ 10-30 YEAR PLANNING HORIZON CORE IDEOLOGY & ENVISIONED FUTURE ~

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***Core ideology** describes an organization's consistent identity that transcends all changes related to its relevant environment. Core ideology consists of two notions: **core purpose** – the organization's reason for being – and **core values** – essential and enduring principles that guide an organization.*

***Envisioned future** conveys a concrete, but yet unrealized, vision for the organization. It consists of a **big audacious goal** – a clear and compelling catalyst that serves as a focal point for effort – and a **vivid description** – vibrant and engaging descriptions of what it will be like to achieve the big audacious goal.*

### **CORE IDEOLOGY**

#### **Core Purpose:**

To foster the advancement and application of microwave theory and techniques to serve the Megahertz-to-Terahertz (MHz-to-THz) radiofrequency (RF) community thereby advancing microwave technology for the benefit of humanity.

#### **Identity - Field of Interest (FOI):**

The field of interest of the society shall be theory, techniques and applications of guided wave and wireless technologies spanning the electromagnetic spectrum from RF/microwave through millimeter-waves and terahertz, including the aspects of materials, components, devices, circuits, modules, and systems which involve the generation, modulation, demodulation, control, transmission, sensing and effects of electromagnetic signals. It shall include scientific, technical, and industrial activities.

Microwave Theory and Techniques applies physical and mathematical principles to analyze structures with dimensions representing a significant fraction of a wavelength or when propagation effects need to be considered.

#### **Core Values:**

- Microwave engineers and microwave engineering benefits humanity and society at large.
- An open, welcoming, collaborative, multidisciplinary community; worthy of local and global volunteerism.
- A platform for education, learning, innovation and opportunities for participation; access to experts; mentoring; peer recognition; accumulated knowledge; information sharing and exchange of ideas.
- Assurance of technical excellence; credible, unbiased, peer-reviewed.

- Professionalism; mutual professional respect, transparency, trust, integrity; ethics.

## **Envisioned Future**

### **Big Audacious Goal:**

- Be the indispensable global, collaborative, multidisciplinary community for MHz-to-THz RF technology for the benefit of humanity.

### **Vivid Descriptions:**

- MTT-S will be the first place RF and microwave engineers throughout the world turn to ensure their success. Junior engineers will start new projects by going to our website. Our student competition program will be the recognized model for other societies. We will have increased young professional and female involvement, and we will be #1 in Chapters.
- MTT-S will be globally recognized by microwave practitioners and their management / institutions as the “authority” of microwaves; the unbiased nexus for open interchange of microwave information, the first choice for dissemination and discussion of microwave science and engineering. Practicing engineers and researchers will rely on MTT-S throughout their careers as the preferred global source for microwave information.
- Our conferences will be “must see, must attend.” MTT-S will have a fleet of successful conferences, fully accessible to the local and global community. Companies will consider our conferences as the #1 place to showcase products/services. As new science and technologies emerge in our field of interest, we will have conferences to address these new areas.
- MTT-S journals will be universally recognized as “the place to publish,” known for the highest quality and the main point of communication in all regions of the world about all things RF from MHz to THz.
- MTT-S’s expanded influence will continue to move well beyond its historical component focus into systems and applications.
- There will be widespread public awareness that MTT-S is the respected, authoritative voice within our field of interest.
- MTT-S will be the leading force in the world for creating, developing and promoting microwave-related multidisciplinary publications, activities and events in collaboration with other IEEE Societies and Councils and non-IEEE entities.
- Our professional and organizational practices such as the International Microwave Symposium and Distinguished Microwave Lecturers will be the recognized model for other Societies and Councils.

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## ~ 5-10 YEAR PLANNING HORIZON ASSUMPTIONS ABOUT THE FUTURE ~

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*Assumption statements will help MTT-S purposefully update the strategic plan on an annual basis. Goals are a necessary foundation for good organizational strategy. Goals are based, in part, on anticipation of the possible future. MTT-S's projected future environment is described in this section. When conditions change, strategy needs to be adjusted. An annual review of these assumptions will help the Society ensure the ongoing relevance of its strategy.*

### **Demographics, Social and Consumer Values**

1. The number of educated people will rise; more so outside of the United States (in proportion to the present).
2. The population in developed countries will continue to age; the population in developing countries is getting younger, and improved healthcare will help lengthen their lives.
3. The centers of innovation may shift, but regulatory and financial forces will drive the shift. Industry will move from developed countries to other countries. There will be changes in both membership demographics and location of technology centers, and there may be a decreasing correlation between these two.
4. The concept of and commitment to volunteerism will continue to vary from country to country, and the enthusiasm for volunteerism may ultimately decline.
5. The emerging millennial generation may not value company loyalty as others in the past have done, and companies will have to work to engage their long-term career interest and commitment.
6. There will be more and more career options available to young people, and we will need to find ways to influence their career choices and encourage them to pursue careers in engineering and our field of interest, and increase awareness of how our technologies contribute to the good of society, as this generation will want a job with meaning.

### **Future of the Profession**

1. The future of the profession will include a much more multidisciplinary focus.
2. Geographic globalization will continue. The world is flat, and information will continue to flow very quickly. This will affect the future of our profession.
3. IEEE collaboration will increase but it will take effort, including both IEEE and non-IEEE organizations.
4. Peer review concepts will continue to vary in different countries.
5. Engineer entrepreneurs will be a key solution to problems, we should encourage that.

6. IP/knowledge will increasingly become a commodity. An issue for companies will be whether to share or not.
7. Engineering may become a commodity and may become less prestigious.
8. Cross-sectorial collaboration and competition for expanding “territory” among different professional organizations become a norm.

### **Global Economic Climate**

1. Anticipating global growth will be flat or small inflation.
2. Cost of labor for engineering will increase in Asia but be flat in US and Europe.
3. Asia will dominate manufacturing of commercial products.
4. Asia will have an increasing design and development role.
5. RFIC technology design and manufacturing will be flat in Europe and increase in US and Asia
6. The economic climate in Africa and South America will lag behind US, Europe and Asia.
7. MTT-S membership will be flat, US will decline, Europe flat, Asia will increase.
8. Superpowers (countries, regions) seem to be willing to spend more on defense; developed countries are spending now and developing countries will spend more in the future.
9. Government investments will shift from military to other areas.
10. Local expertise will continue to attract certain industries, i.e. semiconductor packaging in the Pacific Rim.
11. Microwave education is currently dominated by developed nations but developing countries will grow their programs.
12. Multidisciplinary research and development activities will increase everywhere, which call for collaborative actions among IEEE Societies and Councils and non-IEEE entities.

### **Legislative/Regulatory**

1. Open-access publications will continue to gain momentum from legislative bodies.
2. Legislative push for green, sustainable products and technologies, with research funding for work along these lines.
3. Open sharing of information may be limited to due to export control, patent, competitive reasons.
4. Conflict between standardization & national interests/IP protection (such as in spectrum management and wireless standards) will continue to be important.

5. Research funding will increasingly emphasize impact of research, not just scientific quality.

## **Science and Technology**

1. Consumer electronics will move toward younger ages – younger people will increasingly use them and make buying decision.
2. Wireless wearable electronics, 5G, 6G, internet of things (IoT), wireless power transfer and new space technologies will dominate.
3. Products of the future will include system on chip (SOC) and system in package (SIP).
4. New materials will drive new technologies such as gallium nitride (GaN), indium phosphide (InP), nanotubes, graphene, antimonide based compound semiconductors (ABCS), metamaterials and heterogeneous integration and packaging.
5. Photonics will increase.
6. Multidisciplinary teams will be increasingly important.
7. Systems and the design of systems will become increasingly autonomous and include artificial intelligence and machine learning.
8. Technical direction driven by autonomous systems (spectrum availability/reusable), IoT global connectivity in healthcare and energy/climate.
9. There will be greater design integration with increasing circuit and system complexity requiring increasing design automation and multi-physics simulation.



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## 3-5 YEAR PLANNING HORIZON

### OUTCOME-ORIENTED GOALS

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*Goals are outcome-oriented statements that represent what will constitute the organization's future success. The achievement of each goal will move MTT-S towards the realization of its vision. The goals are not in any order of priority. Every goal will need to be accomplished if the organization is to fully achieve its vision.*

*On the next pages, each goal is accompanied by a set of objectives, which represent key issues affecting MTT-S's ability to achieve the goal and articulate milestones against which to measure progress.*

#### **GOAL 1 – PUBLICATIONS**

MTT-S Publications will be the primary publisher of peer-reviewed papers related to our field of interest.

#### **GOAL 2 - CONFERENCES**

Our portfolio of conferences will provide financial diversification, and technical coverage and regional accessibility, allowing us to be the preferred global partner for conference organizers within our field of interest.

#### **GOAL 3 – EDUCATION AND PROFESSIONAL DEVELOPMENT**

MTT-S will provide opportunities for collaborative learning and will facilitate MHz-to-THz authoritative information exchange to educate and support students and professionals throughout their career paths

#### **GOAL 4 – MARKETING AND COMMUNICATIONS (MARCOM)**

MTT-S will enhance the visibility and recognition of the Society and the value of MHz-to-THz RF science and technology among engineering professionals, advertisers, sponsors, MTT-S membership, the IEEE/RF Community and the general public.

#### **GOAL 5 – COMMUNITY**

Our global community will increasingly and actively engage in our Society and identify with microwaves

#### **GOAL 6 – TECHNOLOGY CAPTURE**

MTT-S will be a nexus for existing and untapped multidisciplinary and/or emerging technologies functioning in our frequency range.

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# GOAL 1: PUBLICATIONS

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## **Goal**

MTT-S Publications will be the primary publisher of peer-reviewed papers related to our FOI.

## **Objectives:**

1. Increase our focus on emerging technologies, RF systems, and applications of RF technology in our publications.
2. Increase publication contribution to the educational mission of MTT-S
3. Enhance the quality and impact factor for all MTT-S publications.
4. Increase our influence on our field of interest.

## **Possible Strategies:**

1. Review and revise marketing and advertising of MTT-S journals.
2. Work with IEEE partner Societies and Councils to revitalize steering committees of co-sponsored journals.
3. Produce special issues based on MTT-S conferences.
4. Monitor the need for and propose new journals, especially in collaboration with our IEEE partner Societies and Councils.
5. Organize special issues around newly emerging fields and technology.
6. Publish more review/tutorial papers.
7. Invite more reviews/tutorials.
8. Solicit articles from leading researchers, especially in emerging technology areas.
9. Increase author education.
10. Work towards broader dissemination of the Microwave Magazine.
11. Work to reduce review time for all MTT-S publications.
12. Increase pool of qualified MTT-S reviewers.
13. Ensure success of new MTT-S Gold Open Access journal (Journal of Microwaves).
14. Ensure success of new journals co-sponsored with IEEE partner Societies and Councils.

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## GOAL 2: CONFERENCES

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### **Goal:**

Our portfolio of conferences will provide financial diversification, and technical coverage and regional accessibility, allowing us to be the preferred global partner for conference organizers within our FOI.

### **Objectives:**

1. Increase industry engagement by encouraging exhibits and involvement in technical sessions in regional conferences, including appropriate partnering opportunities.
2. Achieve the optimum balance between encouraging local autonomy and MTT-S mentorship in conference organization.
3. Expand the reach of our conferences to cover our full FOI and support the microwave community around the world. Include emerging topics of interest to the members at large.
4. Expand participation and robustness through virtual and hybrid conferences.
5. Ensure that attendees view all MTT-S conferences as welcoming.

### **Possible Strategies:**

1. Determine how committees such as MARCOM and International Microwave Symposium Executive Committee (IMSEC) can help in increasing industry engagement.
2. Provide support for online virtual and hybrid conferences and develop best-practice documents.
3. Improve mentoring of local conference organizers with lessons-learned and best-practices documents. Increase involvement of local conference organizers in the Meetings and Symposia Committee. Encourage more networking between local conference organizers. Explore post conference web-based activities such as workshops with exhibitors.
4. Create a “conference incubator” process to help formation of conferences in new technical areas and cover the subset of the MTT-S FOI that the larger conferences do not fully support.
5. Expand conference sponsorship and collaboration sphere with sister/partner Societies in order to reach out to more attendees. This should include a common registration/membership policy.
6. Develop a roadmap for establishing new conferences, particularly in the regions where there is enough interest in microwaves but not much experience in organizing conferences.

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## **GOAL 3: EDUCATION AND PROFESSIONAL DEVELOPMENT**

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### **Goal:**

MTT-S will provide opportunities for collaborative learning (online and virtual) and will facilitate MHz-to-THz authoritative information exchange to educate and support students and professionals throughout their career paths.

### **Objectives:**

1. Increase awareness of MTT-S educational resources among students, young professionals, women, and practitioners.
2. Grow educational resources and opportunities for RF/microwave engineers and practitioners.
3. Enhance regional presence through student programs and activities (i.e. competitions) as well as support for RF/microwave related projects for humanitarian needs.

### **Possible Strategies:**

1. Improve motivation, recruitment and retention of students by bringing microwave science and engineering into educational focus pre-college/university.
2. Develop RF and microwave educational content and practical training materials and deploy through various IEEE offered solutions
3. Collaborate with other IEEE Societies and Councils and non-IEEE entities for the promotion of multidisciplinary education and learning through Distinguished Microwave Lecturers (DMLs) and joint publication.
4. Grow awareness of scholarships and fellowship opportunities and increase application submissions.
5. Support and assist in deploying PhD student sponsorship initiative related programs and activities to enrich student members in Regions 8-10 and at MTT-S sponsored conferences around the world.
6. Manage the MTT-S webinar program and work cooperatively with MARCOM, the Technical Committees and the Distinguished Microwave Lecturer Program to invite speakers.
7. Facilitate and develop the microwave review and tutorial collection for launching MTT-S short books.

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## **GOAL 4: MARKETING AND COMMUNICATIONS (MARCOM)**

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### **Goal:**

MTT-S will enhance the visibility and recognition of the Society and the value of MHz-to-THz RF science and technology among engineering professionals, advertisers, sponsors, MTT-S membership, the IEEE/RF Community and the general public.

### **Objectives:**

1. Make MTT-S invaluable to young professionals, practitioners, businesses and, especially other IEEE Societies and organizations.
2. Expand awareness and recognition of the value of MHz-to-THz RF technology to the general public.
3. Enhance the awareness of the value of the MTT-S to industry, advertisers and sponsors.
4. Expand our online presence.
5. Enable and launch an IEEE MTT-S Resource Center and IEEE Learning Center for MTT-S content offerings.
6. Develop industry partnerships and business strategies for effective Microwave Magazine print and digital advertising, webinars, e-newsletter and white papers.

### **Possible Strategies:**

1. Standardize and enhance the MTT-S brand and identity.
2. Continuously improve and expand MTT-S-branded online content.
3. Develop effective industry partnership models for sponsorship of technical content and advertising at International Microwave Symposium (IMS) and other MTT-S international conferences
4. Reach out to potential supporters, contributors and partners working in multidisciplinary fields through mutual sponsorship, booth sharing, website access and inter-society agreements

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## GOAL 5: COMMUNITY

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### **Goal:**

Our global community will increasingly and actively engage in our Society and identify with microwaves and emerging technologies related to microwaves.

### **Objectives:**

1. Improve member-satisfaction, recruitment and retention.
2. Improve communication with the global microwave community.
3. Improve member and non-member feedback process.
4. Increase ways that non-members can participate in Society activities.
5. Increase the number of MTT-S volunteers.
6. Increase young engineer involvement.
7. Expand MTT-S influence in multidisciplinary fields.
8. Continue to grow Microwaves 101 and the MTT.org online community.
9. Increase inter-societal collaborations, cooperation and participation

### **Possible Strategies:**

1. Create a new young professional student segment leadership who will create and execute new programs specifically targeted to satisfy their own interests and realm.
2. Promote the benefits of involvement and volunteerism, including recognition, community, experience, mentoring, and networking.
3. Increase student chapters as a front line of volunteers to motivate students to engage in microwaves.
4. Create new paths for asking members to volunteer; send personal invitations to members to volunteer.
5. Bring more DML talks to chapters and increase the presence of virtual DML talks, either available to all in social networks, or private in IEEE-MTT Resource Center.
6. Redefine the goals for chapter activities.
7. Create new events and design kits to be used in universities that can be used as a first contact with RF hardware, including short courses.
8. Promote online activities targeting at non-traditional and multidisciplinary microwave fields that can be seen around the world for free, including virtual DML's.
9. Increase SIGHT activities and coordinate with IEEE best practices on humanitarian activities.

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## GOAL 6: TECHNOLOGY CAPTURE

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### **Goal:**

MTT-S will be a nexus for multidisciplinary and emerging science, technologies and applications from MHz to THz.

### **Objectives:**

1. MTT-S will expand its FOI to include new fields or scientific and technology interests as they move through our nexus and link these new fields to the global microwave community.
2. MTT-S will anticipate and promote new societal level application concepts that are strongly dependent on technology within our FOI.
3. MTT-S will enhance cooperation and exploration of technology share with our Sister/Partner Societies.
4. MTT-S will ensure continued leadership in its established technology fields.
5. MTT-S will support technical committee members active in its FOI through opportunities to advance their careers and professional standing.

### **Possible Strategies:**

1. Continued horizon-scanning to track and capture new and emerging areas relevant to our FOI, including “old” areas that may become topical again (*e.g.* WPT).
2. Establish presence in identified application areas within our FOI through recurring collaborative joint activities with other IEEE Societies on conferences, challenges and publications supported by memorandums of understanding (MOUs).
3. Ensure our publication coverage, geographical span and conference activity are of sufficient range to include important new and developing activities.
4. Build broader, more attractive technical offerings with our Sister/Partner Societies.
5. Establish new technical committees in identified major new areas of interest.
6. Provide special access in our publications for emerging technologies, such as an emerging technology column in Microwave Magazine and special issues with possibly non-MTT-S editors, (*e.g.* physics, communications).
7. Work closely with the IEEE Future Directions committee in developing IEEE New Initiatives and make sure MTT-S is involved as participant or organizer of such new initiatives that are within the FOI of MTT-S (*e.g.* IoT initiative).
8. Use sister-society agreements, partner-society agreements, and inter-societal liaisons to expand MTT-S technology and science portfolio (including non-IEEE entities).
9. Expanding the number of DMLs and widen the nomination basis.
10. Building up and highlighting the attractiveness of becoming a DML.
11. Increase the footprint of the DML program, for example through electronic platforms.

If you have comments or feedback on the strategic plan, please contact us via email: [spc@mtt.org](mailto:spc@mtt.org) with subject line: Comment on MTT-S strategic plan.